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March 1989
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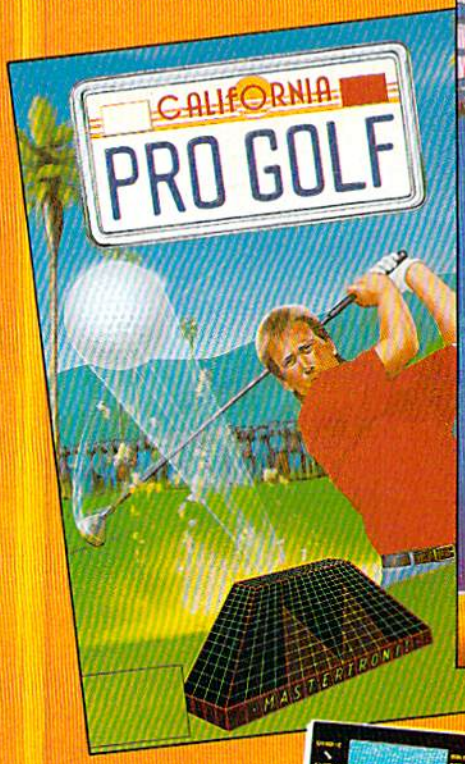

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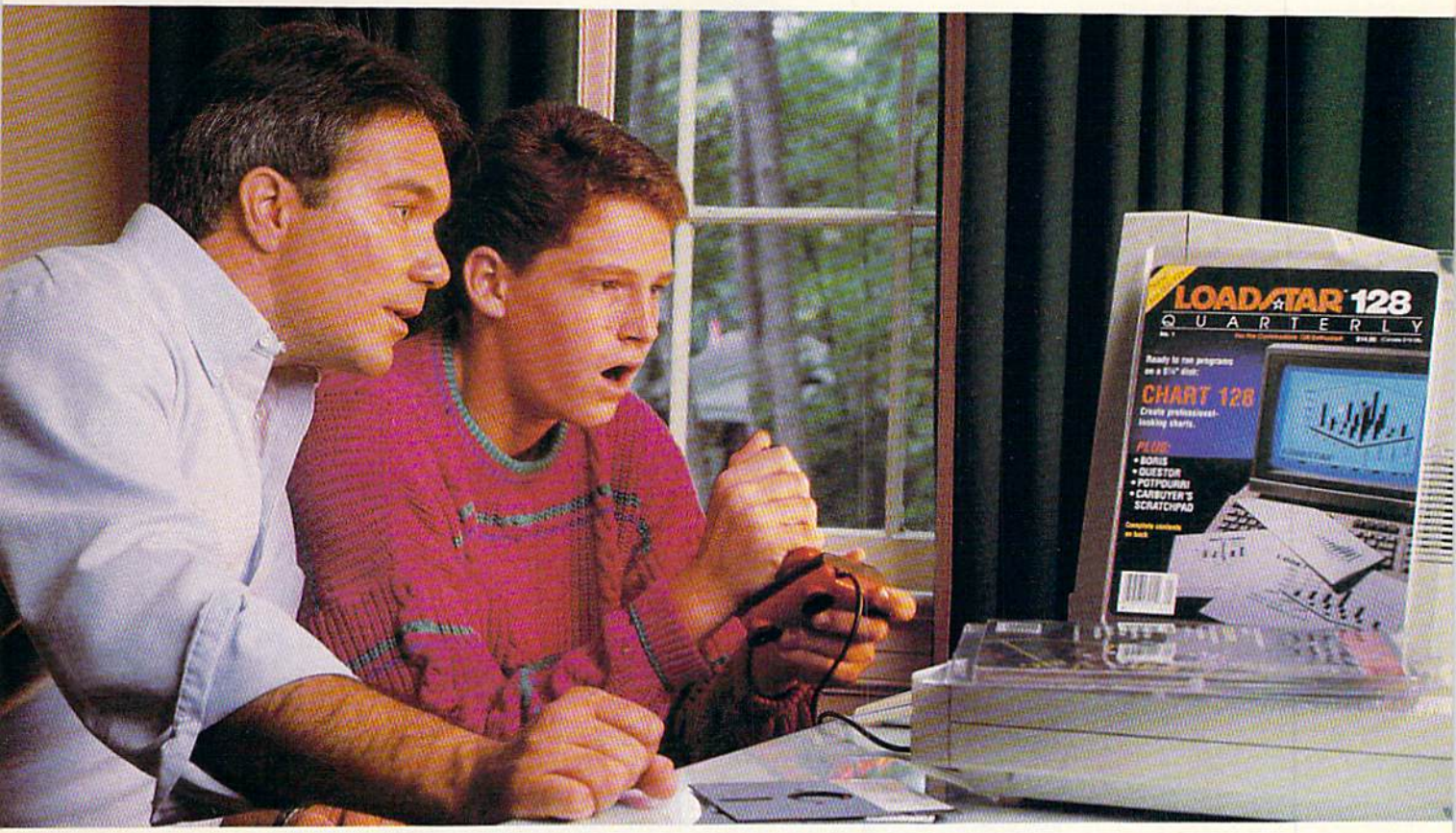

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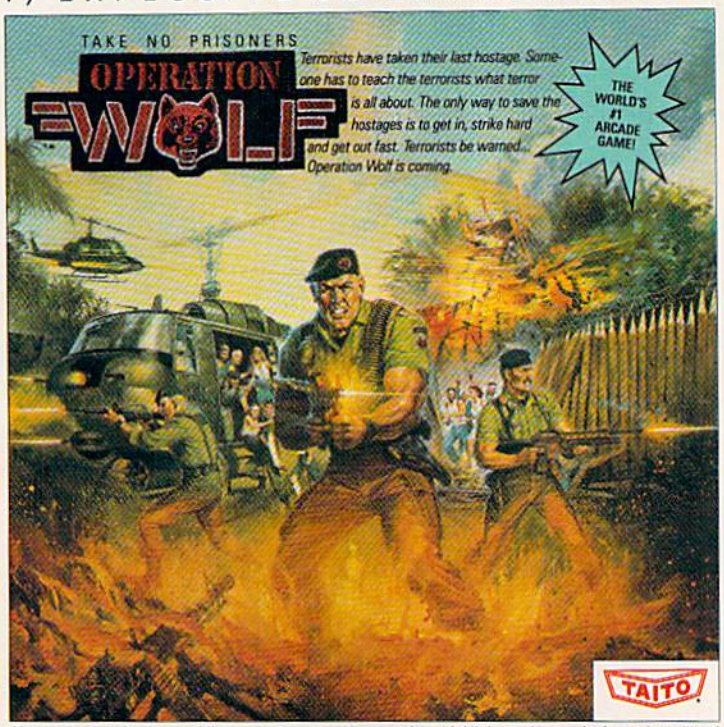
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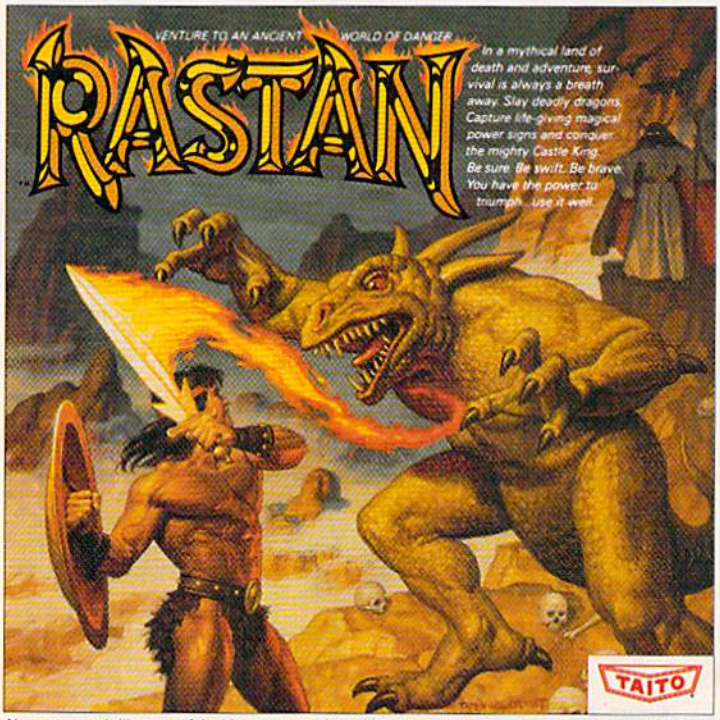
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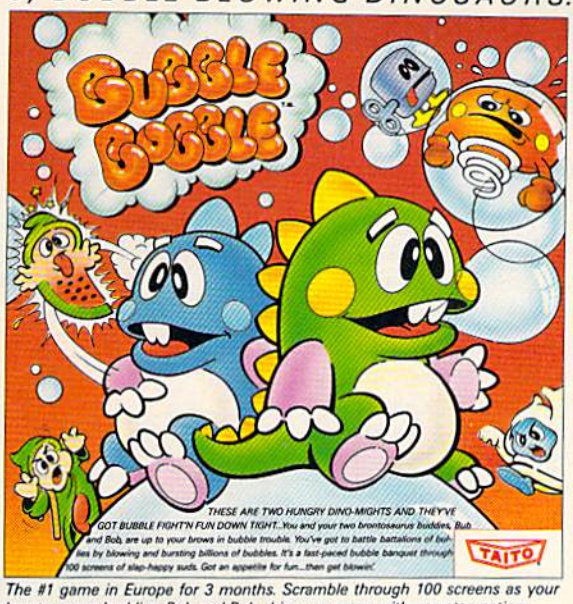
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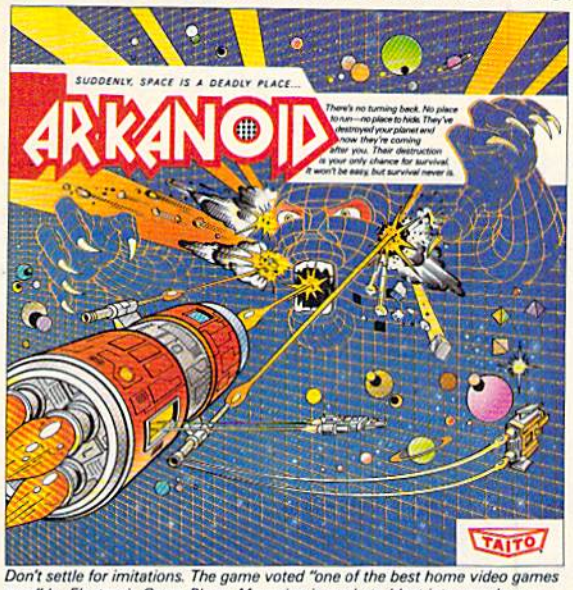
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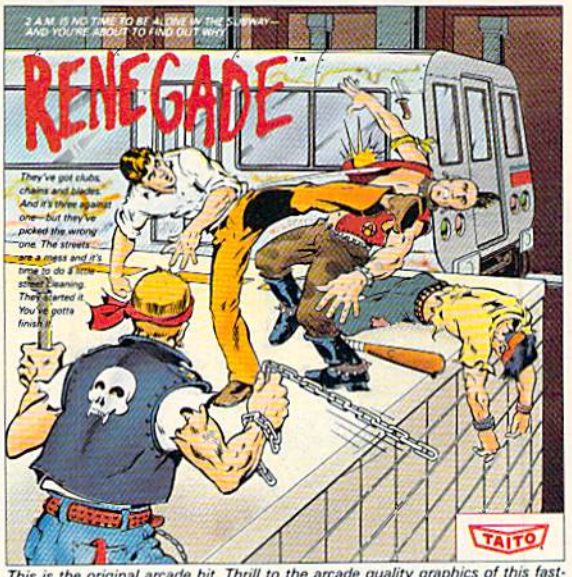
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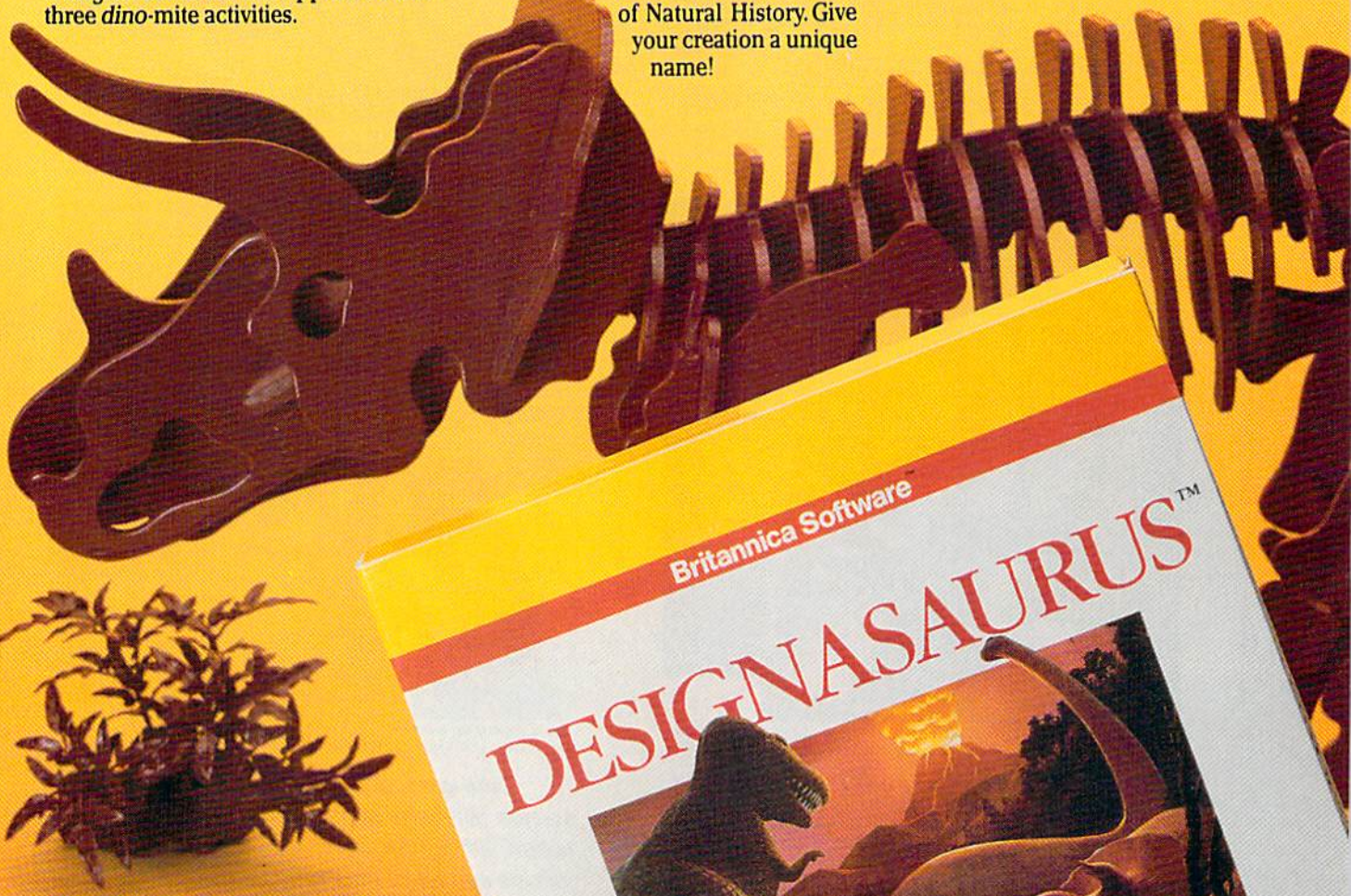

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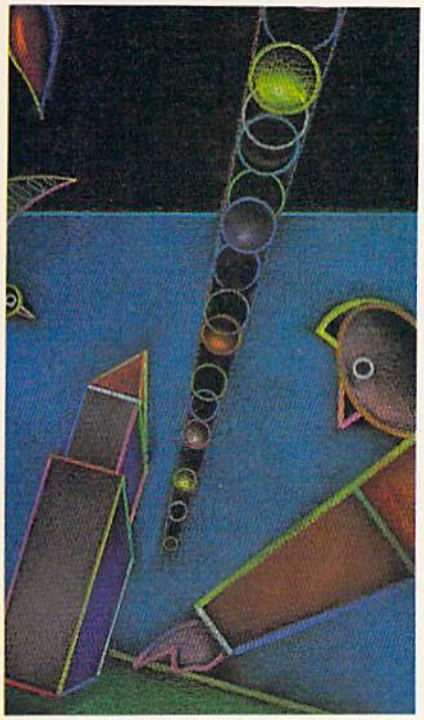

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SCREEN SHOT CREATED BY JAMES HASTINGS-TREW

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RUNning Ruminations

The peripheral shortage is real. . .but is it lasting?

WHILE WE GET many questions from readers on many subjects, we are sometimes inundated by calls, letters and electronic mail on a particular area, indicating unusual concern. Starting last summer, we began getting calls from irate and bewildered Commodore owners who have tried, unsuccessfully, to purchase the 1750 RAM expansion unit and the 1571 disk drive. Users of GEOS 128 were particularly incensed because the 1750 is a virtual necessity for them. Then dealers and distributors started calling, telling us they just couldn't get these products, and wondering if we had heard anything from Commodore. We had not.

In an effort to trace the problem, we called various individuals at Commodore, all of whom assured us that these devices were being manufactured and were available, and they were as puzzled as we that consumers couldn't get them. They did admit that large inventories were not maintained, and that only enough units were manufactured to meet the estimated demand for a given period of time.

At this writing, it is early January, and the shortage continues to be a major problem, fueling renewed rumors that Commodore is dropping the C-64 and C-128 computers. We again contacted Commodore and talked with Jon Winters, Vice President of the Consumer Products Division in West Chester, about these shortages.

According to him, Commodore remains committed to its C-64/C-128 line, but, just as with any other product, it is subject to the pressure of market forces. The 1750 problem is a good case in point.

As most people know, there has been a general shortage of RAM chips in the past year, and what has been available has become much more costly. Due to this, Winter explained, Commodore has had to make hard choices about what products to manufacture, and since the 1750 contains as much RAM as one Amiga 500, four C-128Ds or eight C-64s, they decided to concentrate on the computers rather than on the 1750. I was able to confirm that they did manage to ship some 1750s in the last quarter of 1988, but not enough to eliminate the shortage. They hope to produce and ship more as the chips become available.

As for the 1571 problem, Winter said there were drives in stock, but he couldn't say how many. Since the C-128D comes with a built-in 1571, the demand for single drives has diminished, so they manufacture fewer than before.

The editors and readers of *RUN* would of course like to see all these computers and peripherals produced for a long time into the future. But if, for business reasons, that cannot be, Commodore could greatly ease the problems this would cause by allowing third-party companies to buy the proprietary controller and ROM chips required to manufacture essential peripherals such as the 1571 and 1750. Such a move would allow the continued use of the millions of eight-bit computers for as long as they were needed.

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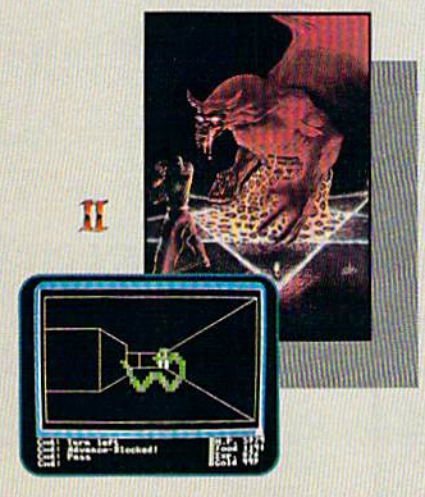

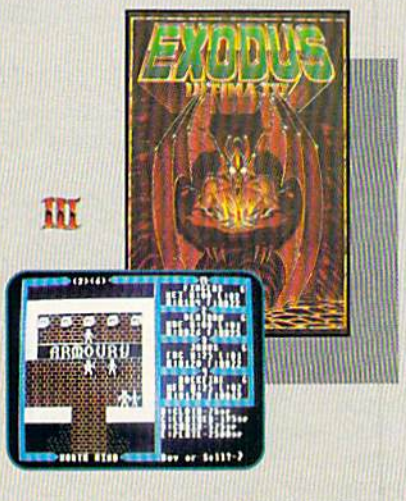

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MAGIC

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Compiled by TIM WALSH

$50E Disk Drive Running? Don't Turn On the Printer!

Recently, while testing a serial Commodore-compatible printer for an upcoming *RUN* review, I broke a fundamental printer rule: I turned on the printer while a file was loading from disk. The result was a lot of garbage on the screen and a partially loaded file.

While it's unlikely that the disk drive could suffer any physical damage, turning on the printer while the drive is busy is potentially disastrous. If you unknowingly loaded in a file and corrupted it in the process, you might also inadvertently re-save it and lose the original. So always remember: Never turn on a printer while the drive is busy.

—Tim Walsh, *RUN* Staff

$50F Autobooting the 1581

Commodore 128D owners who also own a 1581 disk drive face two problems if they want to autoboot or automatically activate a 1581 file. First of all, the C-128D's built-in 1571 disk drive has no DIP switches to reconfigure it with a different device number. Second, the built-in drive can't be de-activated to let the 1581 autoboot.

However, you can make an autoboot disk for the 1571 that boots the desired file from the 1581. Begin by writing a line of Basic such as:

```
10 RUN"1581 FILE",U9
```

(Of course, "1581 File" can be any 1581 file.)

Next, save this program as a file to your 1571 disk, then use the Autoboot Maker program from the 1571 Test/Demo disk to make that an autoboot file. Now, when you turn on your 128D with that disk in the 1571 drive and your second file in the 1581, the program will activate the desired file on the 1581. Many alternatives are possible, such as having autoboot files in both drives. In that case, an autoboot program in the 1571 drive need only consist of a line such as:

```
10 BOOTU9
```

This autoboots the file on the 1581. After you've done this a few times, it will be second nature to you.

—Keith Sills, Rego Park, NY

$510 Meteor Dodge 64

"Captain, she's going to break apart in the meteors!"

Meteor Dodge 64 places you in control of your own starship, indicated by the blue diamond on the screen, which you must pilot through a meteor shower. After you successfully maneuver your ship through a shower, the program goes to the next highest level, which has more meteors for you to contend with.

For those who like to tinker with programs, I'll list the functions of the variables: SC is the score, S is the character position of the ship, C is the color of the ship, and L and X are the level and number of meteors per line, respectively.

```
Ø REM METEOR DODGE - GARRET D. WILSON
                                        :REM*161
1Ø PRINT "{SHFT CLR}{CTRL 7}":POKE5328Ø,Ø:
   POKE53281,Ø:SC=Ø:C=55316:DIM R(4Ø):L=1:
   X=1Ø                                 :REM*17
2Ø S=1Ø44:PRINT"{11 CRSR DNs}"TAB(16)"LEVE
   L 1":FOR A=55316 TO 56295:POKE A,1:NEXT
                                        :REM*44
3Ø FORN=1TO2ØØØ:NEXT:PRINT"{SHFT CLR}{3Ø C
   RSR DNs}{CTRL 2}{CRSR DN}":FORT=1TO75
                                        :REM*77
4Ø POKES,9Ø:POKEC,6:SC=SC+1:FORG=1 TO X:R(
   G)=(1984+(INT(RND(Ø)*4Ø))):GOSUB12Ø
                                        :REM*19Ø
5Ø POKER (G),42:NEXT:PRINT"{CRSR DN}";
                                        :REM*2Ø8
6Ø IF PEEK(S)=42 THEN POKE C,6:GOTO 9Ø
                                        :REM*9Ø
7Ø NEXT:L=L+1:PRINT"{SHFT CLR}{CTRL 7}{12
   CRSR DNs}"TAB(16)"LEVEL"L:X=X+2:IFX>39
   THEN X=4Ø                            :REM*239
8Ø GOTO 3Ø                              :REM*2Ø6
9Ø POKE S,1Ø2:FORN=1TO2ØØØ:NEXT:PRINT"END
   OF GAME":PRINT"SCORE= "SC            :REM*17Ø
1ØØ POKE 198,Ø:INPUT"PLAY AGAIN (Y/N)";PA$
    :IF PA$="Y" THEN RUN                :REM*53
11Ø END                                 :REM*238
12Ø GETM$:P=PEEK(5632Ø)                 :REM*157
13Ø IF (M$=","ORP=123)ANDS=1Ø24THENS=1Ø63:
    C=55335:M$="":POKE1Ø24,32:POKE55296,1
                                        :REM*137
14Ø IF M$=","ORP=123THENS=S-1:C=C-1:POKES+
    1,32:POKEC+1,1                      :REM*85
15Ø IF (M$="."ORP=119)ANDS=1Ø63THENS=1Ø24:
    C=55296:M$="":POKE1Ø63,32:POKE55335,1
                                        :REM*46
16Ø IF M$="."ORP=119THENS=S+1:C=C+1:POKES-
    1,32:POKEC-1,1                      :REM*219
17Ø IF PEEK(S)=42 THEN POKEC,6:GOTO 9Ø
                                        :REM*232
18Ø POKES,9Ø:POKEC,6:RETURN             :REM*18Ø
```

—Garret D. Wilson, Chelsea, OK

$511 Carb Cleaner Versatility

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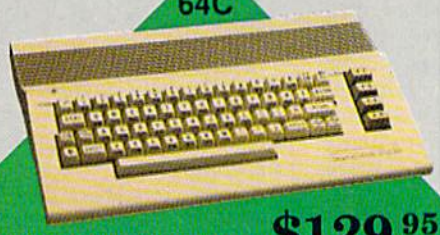

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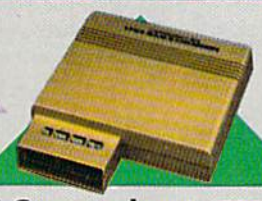

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head, caused by ink, dust, ribbon fabric and other contaminants. Don't rush out to buy a new printhead; instead, spray it with some carburetor spray cleaner or similar spray solvent.

Unbolt the printhead from the printer's carriage and unplug the wire connecting it to the printer. Place the printhead over a newspaper and spray the pins thoroughly with the cleaner. Then use an old toothbrush to scrub loose any matter clogging the pins. Continue spraying and scrubbing the printhead until it's clean.

Let the printhead dry thoroughly for at least an hour before re-installing. Chances are, it'll print like new once you re-install it.

—DWIGHT D. MOODY, GROTON, VT

$512 64 KEYBOARD BUFFER EXPANDER

The C-64's keyboard buffer is a major limitation when used as a dynamic keyboard—it only has a capacity of ten characters. 64 Keyboard Buffer Expander is an interrupt-driven utility that expands the capacity of the keyboard buffer by 245 characters by relocating it to a new memory location.

After you've typed in and run the program, you can use and program it the same way you would the default buffer. With a 255-character limit, you'll want to incorporate this program into all of your dynamic keyboard routines.

```
Ø REM 64 KEYBOARD BUFFER EXPANDER - RICHAR
  D PENN                                :REM*11Ø
1Ø A=88:B=255:C=56334:D=65535:POKE1,55:POK
   EC,PEEK(C)AND(B-1)                   :REM*84
2Ø POKEA+7,Ø:POKEA+8,16Ø:POKEA+2,B:POKEA+3
   ,B:POKEA,B:POKEA+1,B:SYS41919        :REM*227
3Ø POKED,PEEK(D):POKEC,PEEK(C)OR1:POKEC-9,
   56:POKE1,53                          :REM*3Ø
4Ø POKE588Ø5,Ø:POKE588Ø6,192:POKE5881Ø,1:P
   OKE58811,192                         :REM*17
5Ø POKE58813,Ø:POKE58814,192            :REM*146
6Ø POKE6Ø221,Ø:POKE6Ø222,192:POKE649,255
                                        :REM*11Ø
7Ø REM DEMO BELOW                       :REM*247
8Ø PRINTCHR$(147)"EXPANDED KEYBOARD BUFFER
    DEMO"                               :REM*187
9Ø FORT=49152 TO 494Ø7:POKET,65:NEXT:POKE1
   98,255                               :REM*222
```

—RICHARD PENN, MONTREAL, QUEBEC, CANADA

$513 64 KEYBOARD BUFFER REDUCER

If you write programs that prompt for user input, you might find the 64's default ten-character keyboard buffer to be a tad too big for some tasks. I've discovered a command that performs the functional opposite of the above trick. Just enter POKE 649,X in your program, where X is any value from 1 to 10 that determines the size of the C-64's keyboard buffer.

—JEN ST. CLAIR, BELLEFONTE, PA

$514 GENERAL HINTS & TIPS

I thought it would be appropriate to pass along a few hints and tips on Commodore hardware that I've found useful, both at work and at home. First, if your 1581 sits atop another disk drive and slips around, get a bottle of window cleaner and a clean cloth. Flip the 1581 over and spray its feet with the cleaner and wipe them clean. Next, spray and wipe the top of the disk drive it sits on. Voila! No more slipping and sliding.

Commodore 128 users, like myself, who have large fingers, might find pressing the recessed reset button an exercise in futility. I glued a wire nut sized for 12 and 14 guage wire to the reset button using Krazy Glue and now can easily reset the computer.

Finally, to reduce heat buildup, I've placed hard plastic ten-disk diskholders under my computer's power supply and under the 1541 disk drive. I've also glued four $^3/_4$-inch corks to the bottom of my 1541 disk drive for improved ventilation.

I hope *RUN* readers find these tips as useful as I have.

—PATRICK WEST, COLUMBUS, OH

$515 A DIFFERENT KIND OF INPUT

Eliminate the question mark from all Input statements in both 64 and 128 programs by opening a channel to the keyboard. Both the C-64 and C-128 can use the command OPEN 2,0 to access the keyboard, so by writing an input routine, question marks following Input statements can be a thing of the past.

The following program demonstrates how to write an input routine that will eliminate the question mark in Input statements, yet work just like an Input statement.

```
Ø REM 64/128 NO QUESTION MARK INPUT - CHAD
   HELFENBERGER                         :REM*28
1Ø OPEN2,Ø                              :REM*83
2Ø PRINT"ENTER THE ANSWER TO 5 TIMES 5"
                                        :REM*115
3Ø INPUT#2,T                            :REM*216
4Ø IF T<>25THENPRINT"NO, "T" IS WRONG":CLO
   SE2:END                              :REM*238
5Ø PRINT"{CRSR DN}RIGHT, "T" IS CORRECT"
                                         :REM*6
6Ø CLOSE2                               :REM*65
```

—CHAD HELFENBERGER, OWENSBORO, KY

$516 C-64 FILE OPEN COUNTER

Whenever you need to know the number of files open on your C-64 or C-128 in 64 mode, just enter:

```
PRINT PEEK (152)
```

The number that appears is the number of files currently open.

—CHAD HELFENBERGER, OWENSBORO, KY

$517 64/128 GREATEST COMMON FACTORS

As a math teacher, I've found my students often have difficulty finding the greatest common factor of a pair of whole numbers. I wrote the following program, 64/128 Greatest Common Factors, to quickly find the answer. As the name implies, the program works on both the C-64 and C-128.

```
Ø REM GREATEST COMMON FACTOR - TIM MCCAFFE
  RTY                                   :REM*225
1Ø INPUT"LARGER #";L                    :REM*19
2Ø INPUT"SMALLER #";S                   :REM*14
3Ø IF L<S THEN RUN                      :REM*46
4Ø IF L<1 OR S<1 THENPRINT"NUMBER MUST BE
   GREATER THAN 1":RUN                  :REM*13Ø
```

```
5Ø IF INT(L/S)=L/S THENPRINT"GREATEST COMM
   ON FACTOR=";S:END                    :REM*49
6Ø FOR J=2 TO INT(SQR(S))               :REM*196
7Ø IF INT(L/J)=L/J AND INT(S/J)=S/J THEN G
   CF=J                                 :REM*1Ø7
8Ø IF INT(L/(S/J))=L/(S/J)GOTO 11Ø :REM*81
9Ø NEXTJ                                :REM*113
1ØØ GOTO13Ø                             :REM*17Ø
11Ø PRINT"GREATEST COMMON FACTOR = ";S/J
                                        :REM*2Ø3
12Ø END                                 :REM*248
13Ø PRINT"GREATEST COMMON FACTOR = ";GCF
                                        :REM*42
```

—TIM MCCAFFERTY, FLORENCE, AL

$518 FLASHY 64 DISK LOADS

Make loading programs more interesting and less boring by using Flashy 64 Disk Loads in either Direct mode or in your programs. After typing in and running the program, whenever the disk drive loads a file, the C-64's screen border will rapidly cycle through all 16 colors until the drive stops.

The interrupt-driven program won't be affected by most other programs. Pressing the run-stop/restore key combination will disable it, while POKE 1,53 will re-enable it.

```
Ø REM C-64 FLASHY DISK LOADS - RICHARD PEN
  N                                     :REM*193
1Ø A=88:B=255:C=56334:D=65535:POKE1,55:POK
   EC,PEEK(C)AND(B-1)                   :REM*84
2Ø POKE A+7,Ø:POKE A+8,16Ø:POKE A+2,B:POKE
    A+3,B:POKE A,B:POKE A+1,B:SYS 41919
                                        :REM*227
3Ø POKE D,PEEK(D):POKE C,PEEK(C) OR 1:POKE
    C-9,56:POKE 1,53                    :REM*3Ø
4Ø FOR T=679 TO 679+8:READ D:POKE T,D:NEXT
                                        :REM*25
5Ø DATA 238,32,2Ø8,12Ø,169,Ø,76,22,238
                                        :REM*244
6Ø POKE 6Ø947,76:POKE 6Ø948,167:POKE 6Ø949
   ,2                                   :REM*4Ø
```

—RICHARD PENN, MONTREAL, QUEBEC, CANADA

$519 RIBBON STORAGE TIPS

Here's a handy tip for both new printer ribbons and color ribbons that are used infrequently: Store all nylon and fabric printer ribbons in resealable plastic bags. You'll find that they won't dry out as soon as they will when sitting in their original boxes or in the printer.

—DON ENGLERT, GREEN RIVER, WY ■

Magic is a forum for RUN*'s imaginative and inventive readers to share their programming tips, brief software or hardware modifications, shortcuts or items of general interest. If you have an idea to make computing easier, faster, more exciting and enjoyable, send it to: Magic, RUN Magazine, 80 Elm St., Peterborough, NH 03458.*

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NEWS AND NEW PRODUCTS

New products for March have come in like a lion, from timely tax programs to sketchpads and games for your C-128 and 64.

Compiled by HAROLD R. BJORNSEN

SHOGUN AND ZORK

CAMBRIDGE—It's the 16th century and you're John Blackstone, an English sea pilot who finds himself in the foreign and exotic Japans. You're thrust in the upper echelons of feudal Japanese society at the moment a political power struggle is erupting between two Japanese regents who aspire to be Shogun. The action revolves around this struggle, which influences and ultimately controls your life. Shogun, a game for the C-128, is available for $49.95.

Zork Zero, the prequel to the Zork trilogy, covers a century of time and explores the collapse of the Great Underground Empire. The game has more than 200 locations and as many puzzles as in all of the Zork trilogy. As the game opens, the Flathead family, rulers of the kingdom, has already been destroyed. Your challenge is to save the rest of the kingdom from the fated curse that Megaboz, the evil wizard, has cast. Zork Zero is available for the C-128 for $49.95. Infocom, 125 Cambridgepark Drive, Cambridge, MA 02140.

Check Reader Service number 400.

HOLD ON TO YOUR WALLET

TWO HARBORS, MN—Taxaid, an income tax preparation program for the C-64, includes all the current changes in the tax laws for the tax year 1988. It prepares Form 1040, Schedules A, B, C, D, E, SE, and Form 2441 (Child Care). Calculations are automatic and all tax tables are built in. The program is completely menu driven. It costs $49.95 from Taxaid Software, Inc., PO Box 100, Two Harbors, MN 55616.

Check Reader Service number 404.

PREHISTORIC COLORING BOOK

BATAVIA, IL—Polarware (1055 Paramount Parkway, Suite A, Batavia, IL 60510) has released Dinosaurs are Forever, an educational coloring book for the C-64. Your child is the artist, who can choose his or her own colors to color in each dinosaur. The child will learn how each dinosaur evolved, its approximate weight and size, and its eating habits. The program also makes banners and posters. There are 22 line drawings of different dinosaurs and 16 colors on the color palette. It's available for $29.95.

Check Reader Service number 401.

Children can color up to 22 dinosaurs in Polarware's Dinosaurs are Forever.

BIG BROTHER'S WATCHING YOU

RANDALLSTOWN, MD—Master Software (6 Hillery Court, Randallstown, MD 21133) has released its 1988 version of Tax Master to help aid in the preparation of U.S. Federal Income Taxes. It covers all the confusing new tax laws and guides you through the preparation of Forms 1040 and 4562 (Depreciation), and also Schedules A (Itemized Deductions), B (Interest and Dividends), C (Small Business), D (Capital Gain/Loss), E (Rent/Royalty Income/Loss), and F (Farm Income/Loss). Tax tables are also included, and the program figures your tax automatically, performs all calculations and can transfer results from one tax form to another. Tax Master is fully menu driven and is available for the C-64 for $32.

Check Reader Service number 402.

CONQUER THE TEMPLE OF DEMONS

SAN JOSE—Victory Road, the arcade sequel to Ikari Warriors, has been released for the C-64 by Data East USA (470 Needles Drive, San Jose, CA 95112). The sequel continues the quest of the two heroes from Ikari Warriors to battle fearsome enemies and conquer the Temple of Demons. Using an assortment of weapons, the player must fend off bizarre enemies to successfully complete all four levels of the game. $29.95.

Check Reader Service number 405.

SKETCHPAD 128

KUTZTOWN, PA—Free Spirit Software (PO Box 128, Kutztown, PA 19530) has released Sketchpad 128, a drawing system for the 128's 80-Column mode and 1351 mouse. Sketchpad can be used to create artwork, slideshows, signs, posters and letterheads. Features include a selection of drawing tips, 3-D solids, fill patterns, type fonts, and pixel and grid editors. In addition, the program is completely menu driven, enlarges and scrolls screens and supports 64K video RAM and the 1581 disk drive. $17.50.

Check Reader Service number 406.

YES, BUT CAN YOU BEAT UP THE REFEREE?

NEWARK, DE—Two volumes in the World Wrestling Federation SuperStars series are now available for the C-64 at $19.95 each. Volume 1 pits the Honky Tonk Man against Randy "Macho Man" Savage in a fight for Elizabeth's affection. A second match has "Hacksaw" Jim Duggan battling

King Harley Race. In Volume 2, Match 1, Hulk Hogan faces Ted DiBiase, the "Million Dollar Man." Match 2 has Ravishing Rick Rude squaring off against Jake "The Snake" Roberts and his snake. In all matches, you apply your managerial and directorial talent to bring your man to victory. The ML/WWF Game-Match disk is required. MicroLeague Sports, 2201 Drummond Plaza, Newark, DE 19711.

Check Reader Service number 407.

Out into Outer Space

GLEN ROCK, NJ—Absolute Entertainment (PO Box 116, Glen Rock, NJ 07452) has released Garry Kitchen's Star* Fighter, a high-speed, space-flight simulator for the C-64. It provides you with an intergalactic fighter armed with particle lasers, photon torpedos and heat-seeking missiles, an on-board computer system, shields, scanning capability and computerized maps of interstellar space. With these, the player who can combine cunning, caution and good judgment will find that success brings riches and power. $34.95.

Check Reader Service number 409.

Volleyball in Zero Gravity

PONTIAC, MI—In Zero Gravity, an arcade game for the C-64, you're on a journey into the farthest reaches of space in the year 2189. But travel through space can be boring, so Zero Gravity, a game similar to volleyball, was developed. In the two-player game, the ball can careen off the bulkheads at strange angles, and panels along the sides can be struck at different times to add or subtract points from your score. It's available for $29.95 from MichTron, 576 S. Telegraph, Pontiac, MI 48053.

Check Reader Service number 408.

High-Speed WP

DEERFIELD, IL—GEOS Writer 64, a word processor for the C-64 and GEOS 1.3 or later versions, features a Preview mode to display your document on-screen exactly as it will appear on the printed page; a 100,000-word spelling checker; a variety of built-in, special effect fonts; and high-speed text entry that, according to the manufacturer, is five times faster than other GEOS-based word processors. In addition, the program lets you use a mouse, joystick or the keyboard to move around a document and select editing and formatting options. It's also compatible with geoPaint and geoWrite so that you can import all GEOS fonts and graphics into your documents. Available for $39.95 from Timeworks, Inc., 444 Lake Cook Rd., Deerfield, IL 60015.

Check Reader Service number 415.

Off to the Wars

MOUNTAIN VIEW, CA—Typhoon of Steel, a sequel to the Panzer Strike! war game, covers the Pacific, Asian and European theatres, involving American troops versus German troops. The tactical game includes many different kinds of ground weapons, from tanks, tank destroyers and artillery to trucks, mortars and machine guns. Pillboxes, minefields, dragon's teeth, flamethrowers and naval gun support are also included. Players can choose to simulate single battles or an entire campaign. The objective is to win as many battles as possible before the war ends. Available for the C-64 for ►

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$49.95. Strategic Simulations, Inc., 1046 N. Rengstorff Ave., Mountain View, CA 94043.

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157 Dungeon Levels

SAN MATEO, CA—Deathlord, a fantasy role-playing game for the C-64, has you storming 157 dungeons, facing 128 different kinds of monsters, exploring 16 separate continents, mastering 84 magic spells, and dealing with the problems posed by changing climate, weather and the time of day. You create your own characters but may also transfer characters from The Bard's Tale, Wizardry I, II and III and Ultima II role-playing games, and use them in 16 character classes. The Deathlord had besieged the Emperor of Kodan and claimed the Empire for his own. You and your party must restore peace to the land. Begin your adventure for $29.95 from Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404.

Check Reader Service number 412.

Gut-Busting Karate Action

MENLO PARK, CA—Chop and Drop, a karate action game for the C-64, has been released by Activision (3885 Bohannon Drive, Menlo Park, CA 94025). The one-player game has two karate characters on the screen at all times, and the two-player game has three. To earn points, you must use a combination of 16 different karate blows to knock down your opponents as many times as possible in timed rounds. $29.95.

Check Reader Service number 413.

$#%&!%$#*!

BELLINGHAM, WA—What do you do when your computer goes awry? Push the panic button. The bright red computer key is imprinted with the word PANIC, and its adhesive backing lets you mount it on any computer keyboard key. The buttons are available for $1 each plus an SASE. For 10 orders or more, Memory Makers (3024 Haggin St., Bellingham, WA 98226) pays postage.

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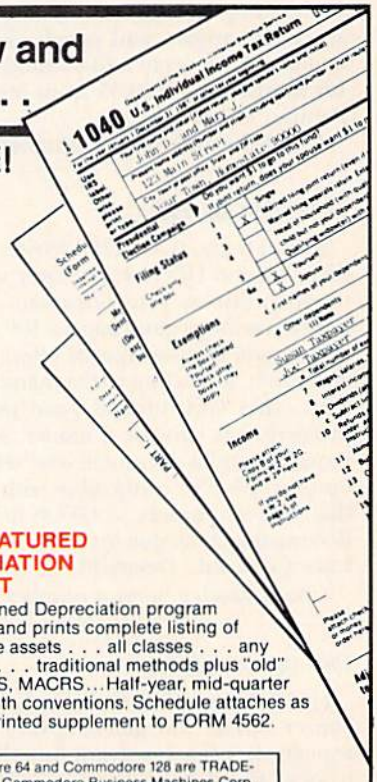

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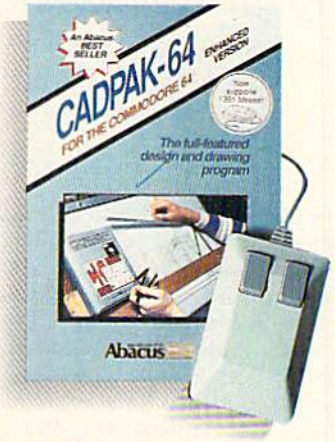

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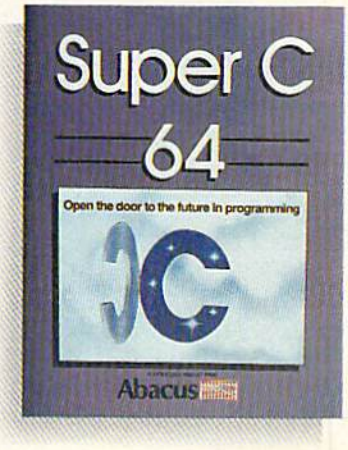

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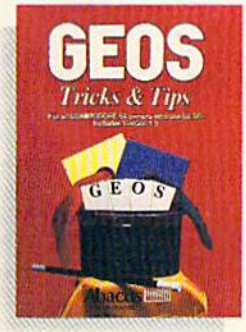

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SOFTWARE GALLERY

'Tis the luck of C-64/128 owners this month that brings reviews of sports, fantasy, music and trivia programs, and much, much more!

Compiled by BETH S. JALA

TOWER TOPPLER ..... A

Going Up? Next Stop. . .
The Top Floor!

Just when you thought you'd seen every possible variation of the arcade-style climbing contest, along comes Tower Toppler to throw you a curve—in more ways than one. The object of this game is to destroy eight towers that loom high above a toxic ocean. To do so, you must mount the treacherous spiral staircase that winds around the outside of each tower, and eventually reach the top.

Of course, some of the steps are rather slippery, others crumble beneath your feet and some are missing. At various points, you can take advantage of outside elevators that bring you part of the way up to the top. In other places, you must enter doorways only to re-emerge on the opposite side of the tower to continue the climb.

You also have to contend with flying eyeballs, mutant molecules, indestructible rolling cannon balls and deadly flashing blocks. Each of the eight towers is more difficult to scale than the one before. Their names—Tower of Eyes, Realm of Robots, Broken Path, Slippery Slide, and so on—give some indication of the type of trouble you can expect. To survive, you must be sure-footed and a good shot with your only weapon, a snowball gun that's capable of destroying many of the obstacles.

Tower Toppler boasts some of the most impressive animation I've seen in a long time. As your joystick-controlled character—an adorable green head with big eyes and tiny legs—climbs the winding stairs to the top of the tower, your perspective smoothly shifts to keep him in the center of the screen. Thus, the tower, along with the star-filled background, rotates as the green guy moves to the left or right. In addition, simultaneous vertical movement by the on-screen character results in smooth vertical scrolling of the tower.

Tower Toppler is the type of game that's almost as much fun to watch as it is to play. In fact, because the game demands your undivided concentration to scale its eight colorful towers, it might be impossible to fully appreciate the sharp graphics and smoothly animated action except as a spectator. *(Epyx, 600 Galveston Drive, PO Box 8020, Redwood City, CA 94063. C-64/$39.95.)*

—BOB GUERRA
SOUTH BOSTON, MA

OUT RUN ..... B+

Rev It Up in
Road Rally Racing!

A powerful car + splendid sound + fantastic graphics = one hit game. This is the formula Sega employs for the arcade version of Out Run, and the same elements have been included in the C-64 adaptation.

The program offers five different courses and each is divided into four sections. Only by completing one stage within a predetermined time can you advance to the next. Failing to do so forces you to start back at a course's beginning in a new game.

Cool car, solid sound and groovy graphics characterize Out Run.

Making the trip difficult are the cars and trucks that you overtake when traveling at up to 295 kilometers per hour; running into them costs precious seconds. Hitting the trees and structures that border the highways at top speed results in a spectacular tumbling wreck. After a crash, you and your car miraculously recover and continue from that point, but you've lost valuable time and momentum.

Points are awarded for fast driving. Out Run also gives a special bonus for completing a course. During each session, the program displays the top seven scores with their owners' initials, although none of this data is saved to disk.

You use a joystick to steer, accelerate and brake your auto, and pressing the button shifts between gears. This arrangement is surprisingly effective, especially considering that the program's coin-operated model was equipped with a steering wheel, gas pedal and gear shift lever.

Out Run's sound effects are excellent. While there is an option to turn off all game noises, you'll probably want to hear one of the two pulsating background themes. Equally well done are the car sounds, like the screech of tires as you fight to keep control when rounding a curve. ►

REPORT CARD

A Superb!
An exceptional program that outshines all others.

B Good.
One of the better programs available in its category. A worthy addition to your software library.

C Average.
Lives up to its billing. No major hassles or disappointments here.

D Poor.
This program has some problems. There are better on the market.

E Failure.
Many problems; should be deep-sixed!

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The software's graphics are even better, filled with exotic scenes painted by bright and continually changing colors. Sega has also done a tremendous job with the game's animation; it gives the exciting illusion of racing at breakneck speed.

Yet, for some players, all of this sensory richness won't be enough. In particular, those who enjoy the mental challenge of devising elaborate tactics might best look elsewhere. Fast reflexes, instead of heavy thinking, are needed to win in this contest.

Nevertheless, Out Run does deliver what its package promises: "Hot car. Hot music. Sensational scenery." For hundreds of thousands of racing fans, that's enough to guarantee that Sega's gaming formula is as big a success on the C-64 as it is in the arcades. *(Sega; distributed by Mindscape, Inc., 3444 Dundee Rd., Northbrook, IL 60062. C-64/$34.95.)*

—WALT LATOCHA
OAK PARK, IL

FAST BREAK ..... B+

"He Steals the Ball, Runs the Length of the Court, and. . .Swish!"

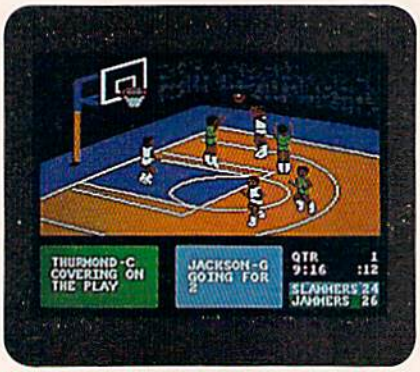
Think of Fast Break as Accolade's version of an in-your-face slam dunk. It might not shatter backboards in any one area, but it does feature a combination of attributes worthy of a champion. It's an impressive program that should score plenty of points with roundball fanatics.

Fast Break hits from three-point range with its graphics and life-like animation. The on-screen players are as clear and well-defined as any sports simulation I've seen; no flickering images here.

Players move smoothly up and down the court, realistically running, jumping and shooting. They also respond fairly quickly and accurately to joystick input.

But Fast Break isn't only about slam-bam action and quick reflexes. It's also a strategy game that lets computerists choose the players on their team and select the plays they'll run. Other features include competing against the computer or a friend, playing quarters that last from three to 12 minutes, or opting for the Practice mode.

The rules in Fast Break are essentially the same as in the NBA. Six fouls and a player is ejected from the game. Teams have 10 seconds to get the ball past half-court and 24 seconds to take a shot. Unlike real basketball, however, there are no foul shots, nor are there any walking or double dribble violations, and you can't throw or dribble the ball out of bounds.



Information boxes on the bottom of the Fast Break screen keep you abreast of what's happening on the court.

Fast Break is a full-court game, but only one half of the court appears at any time. Players who happen to be on the half of the court opposite the ball aren't visible and are therefore difficult to control.

While perspective is good, there's one minor problem. Since there's virtually no horizontal scrolling, it's a little disconcerting when a player moves from one half of the court to the other. The screen seems to go blank for a split second, and then the players and court reappear.

One player per team can be controlled by the joystick at any time. This player flashes to distinguish him from his teammates. On offense, the joystick controls the player with the ball. On defense, the joystick controls the player closest to the ball at a change of possession, but a quick jab at the firebutton shifts control to the other two players in sequence. Because operation is logical and intuitive, it doesn't take long to get used to Fast Break's controls.

There really is a noticeable difference in the performance of the players. Some shoot better, run faster or rebound more strongly than others. So, it's important to keep an eye on the information boxes at the bottom of the screen, which identify the man with the ball and his defender. It's also wise to make substitutions, since minutes played affect performance.

That's what you call attention to detail. And it's details such as those that make Fast Break a class act. *(Accolade, 550 S. Winchester Blvd., Suite 200, San Jose, CA 95128. C-64/$29.95.)*

—SCOTT WASSER
WILKES-BARRE, PA

OCEAN RANGER ..... B

Dangerous Reconnaissance Activity from the Safety Of Your Computer Room

Ocean Ranger puts you in command of a modern hydrofoil patrol craft and offers you a variety of missions. Your assignments include Basic Training Duty, Regular Forces Duty, Central Intelligence Agency Duty and National Security Council Duty, and you can patrol four increasingly hazardous areas of the world—the Bering Sea, Southeast Asia, Central America and the Persian Gulf.

Each mission involves destroying a primary and a secondary target. A single target might be an entire squadron of Soviet MIGs or a small fleet of enemy destroyers. Other targets include submarine packs and underwater mines. You're given a set of coordinates for each target within the general area you're patrolling.

To eliminate the primary and secondary targets, as well as any enemy threats you'll face en route, the Ocean Ranger is equipped with several types of weapons, including a 76mm cannon, Sea Sparrow surface-to-air missiles, Harpoon missiles and depth charges. In addition, chaff rockets and ECMs (Electronic Counter Measures) can be used to throw incoming radar-guided missiles off your trail.

You have a choice of several main displays: the view from the bridge facing the bow, stern, port or starboard sides of the boat; damage and maintenance reports; or a tactical, area or coordinate chart. In addition to the main display, two small monitors at the bottom of the screen can be set independently to any of seven channels. Unfortunately, most of these displays are more decorative than functional.

Ocean Ranger comes with a Captain's Manual that contains complete instructions for commanding your ship, along with the security codes needed to access the personnel-records screen and to begin the game. These codes serve as copy protection for Ocean Ranger; the disk can be backed up using the program's built-in copy utility. Also included in the game package is a keyboard overlay that makes a snap of finding the correct weapon and navigation keys.

Although Ocean Ranger has a bit of an arcade feel, on the most difficult levels, it gives even veteran hydrofoil captains more action than they can handle. In addition, it lets you start as a Lieuten- ►

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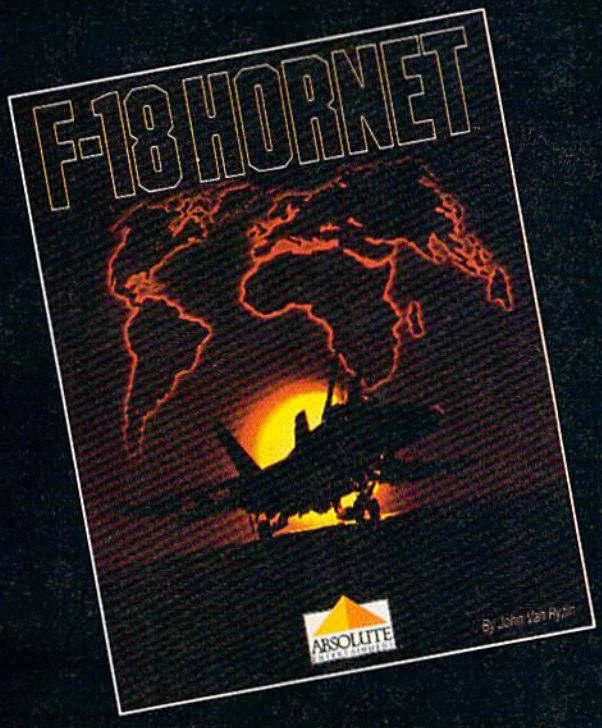

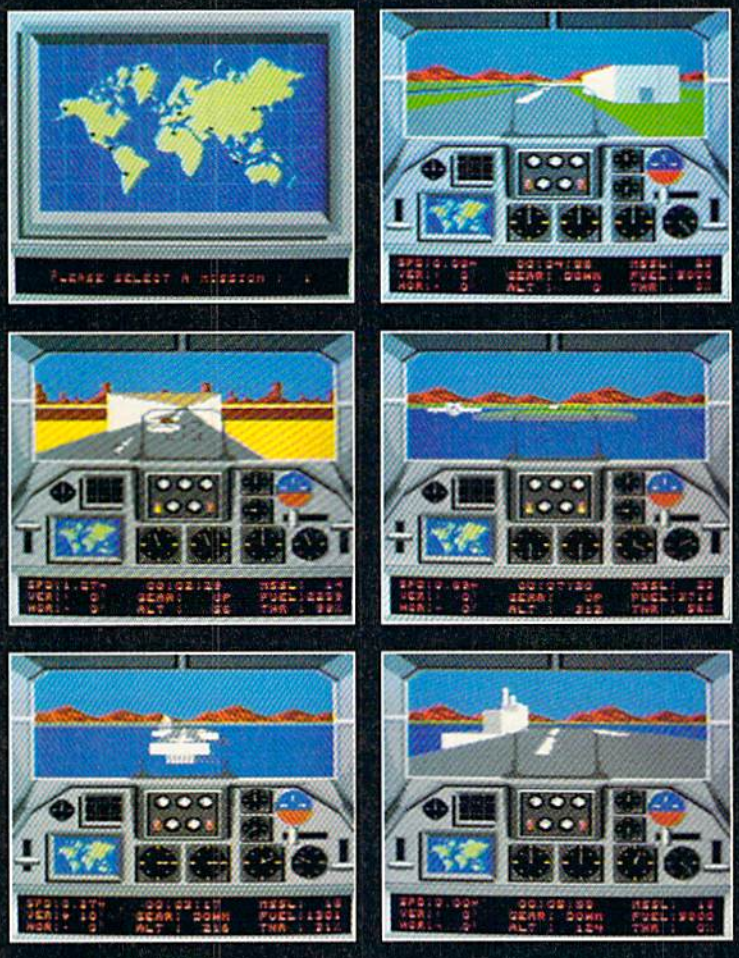

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*New York Times, December 20, 1988.

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ant and work your way up to the rank of Admiral, earning medals and service ribbons along the way. *(Activision; distributed by Mediagenic, 3885 Bohannon Drive, Menlo Park, CA 94025. C-64/$34.95.)*

—BOB GUERRA
SOUTH BOSTON, MA

BARBARIAN ..... B

A Better Barbarian Has Barely Been Born!

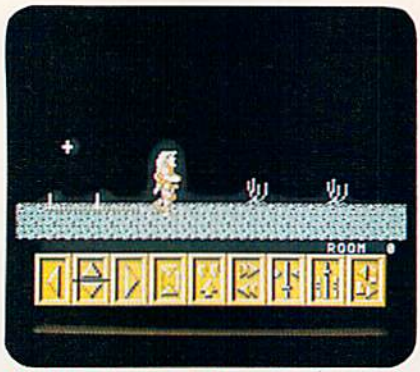
After playing the fantasy arcade game Barbarian, any C-64/128 owner considering the purchase of a Nintendo or other game system should certainly reconsider. After all, why invest hundreds of dollars in a dead-ended, cartridge-based machine when the very types of programs one is looking for in a game system are available on disk for one's own computer?

Thematically, Barbarian breaks no new ground. In the role of Hegor the Barbarian, the great dragonslayer, you must enter an underground world to do battle with your father's murderer, the evil Necron. Along the way, there are numerous screens to traverse, treasures to secure, traps to avoid and monsters to kill. The quest doesn't end with the defeat of Necron, however. Other tasks must be accomplished, including returning to the surface before the underground volcano blows.

Barbarian's graphics and animation are first-rate. A variety of evil characters populate this world, all clearly and colorfully drawn, and each type possesses individualized movements. Hegor travels smoothly from screen to screen against vivid, sharply etched backgrounds. Occasionally, he appears to be floating up steps, and the arrows he picks up look more like miniature columns, but these are relatively minor flaws.

One characteristic that sets Barbarian apart from its arcade-like competitors is the uniqueness of its control system, manipulated by either joystick (recommended) or keyboard. By positioning the cursor over any one of a series of icons located on the bottom of the screen and clicking the joystick button, you can access a variety of action commands.

This system tends to be a bit cumbersome on the C-64, possibly due to the game's origins as a mouse-controlled product for the Amiga and the Atari ST. The process is made easier, however, by the logical layout of the icons in relation to each other, and by letting the user control Hegor's walking, climbing, turning and stopping by placing the cursor in front of, behind, above or below the figure. That way, if you foresee disaster, you don't have to go looking for the appropriate icon in order to stave it off. My only complaint here is that Hegor seems to have his own mind at times, particularly when it comes to going up or down ladders.



Clicking on icons is the way you control Hegor in Barbarian.

Since there is no save-game feature, by the time Hegor reaches Necron, the average player should have almost every screen memorized. Nevertheless, mapping this relatively compact (48-room) underground world is recommended because you only have a limited amount of time to escape once your tasks are completed. A definite drawback to Barbarian is that it could have little replay value once your quest is concluded.

One very nice feature appears after you've used up the last of your four lives: The program informs you of the percentage of rooms you have explored. With the knowledge that with each game your percentage is improving, you begin once more to journey forth.

So, if it's attractive graphics, graceful animation and exciting game play you're after, hold off on buying that game machine, and instead put some of that money toward the purchase of Barbarian. *(Melbourne House; distributed by Mastertronic International, Inc., Mesa Business Centre, Unit G9, 711 West 17th St., Costa Mesa, CA 92627. C-64/$29.99.)*

—LEN POGGIALI
SYRACUSE, NY

THE MAESTRO ..... B–

Music, Maestro, Please!

The Maestro is a music program that uses the C-64's three-voice SID (Sound Interface Device) chip to play musical compositions in a variety of keys and time signatures. It's ideal for anyone familiar with musical notation who needs a way to turn printed sheet music into code the SID chip can play.

Music is entered, one measure at a time and one voice at a time, by moving a joystick-controlled cursor to the appropriate space on the musical staff and pressing the firebutton. Pre-programmed changes in tempo, volume and voicing can also be entered.

The Maestro's music-entry screen actually displays two staves: a treble staff for entering notes with a pitch of middle C or higher, and a bass staff for notes below middle C. As you might expect, vertical placement of a note determines its pitch. What's interesting about The Maestro's system of musical notation, however, is that note duration—whether a note is a 32nd, a 16th, an 8th or a quarter-note—isn't determined by the shape of the note as it is in standard notation, but rather by where the note is horizontally placed on the staff. Notes don't even appear on the one-measure staff as they're selected; instead, the note's letter name, octave and duration are listed below the staff.

After each note is selected, the staff is replaced by an Adjustments Menu that lets you alter the basic pitch and duration of the note by dotting it, making it a sharp or a flat (or natural if the key signature already designated the note as sharp or flat), raising or lowering the note's pitch by an octave, changing it to a triplet, or tying it to another note. Once all of the notes and rests for a single measure of one voice are entered, you get to review the list of notes and approve the current measure before moving on.

For each of your three voices, you can select one of eight pre-programmed instrument sounds: piano, reed, harpsichord, xylophone, organ, guitar, strings or brass. While none of these could ever be mistaken for the real instrument, they do offer a nice variety of timbres with which to arrange your compositions.

In addition, The Maestro comes with a separate utility that lets you create new sounds by selecting the waveform, setting the pulse width and defining the ADSR envelope. Unfortunately, other parameters controlled by the SID chip such as filtering and ring modulation, aren't adjustable through this utility.

You should also be aware of some of the program's other minor limitations. First, The Maestro has no MIDI capabilities, so if you have a MIDI-equipped synthesizer or are planning to buy one,

you won't be able to use it with this program. Also, since it's designed basically as a tool for entering sheet music into your C-64, the designers felt it unnecessary to include an option that lets you print your music.

Finally, some users might have a problem with The Maestro's system for designating octaves. Usually, when you have eight octaves labeled zero through seven, zero represents the octave that's lowest in pitch and seven designates the highest. This is how things work within the aforementioned utility, but the system is exactly opposite within the main program.

On the plus side, The Maestro is not copy-protected, and it comes with 24 demonstration compositions right on the program disk, as well as an indexed, 66-page user's manual. The manual isn't slickly produced, but it's well-organized and does a thorough job of taking you through the various functions of the program. *(Zwetzig Associates, 5932 Bruns Court, Oakland, CA 94611. C-64/$24.95.)*

—BOB GUERRA
SOUTH BOSTON, MA

Editor's Note: To give our readers more coverage of the many C-64/128 software products available, RUN *is broadening the scope of Software Gallery by presenting more reviews in capsule form.*

RASTAN ..... B

You are Rastan, a mighty warrior in an ancient land, and you must defeat an evil king. While this plot is sure to be familiar to arcade gamers, there is much to make the program stand out from other sword-and-sandal offerings: the graphics—characters are bright, colorful and well defined; the scrolling—smooth, almost seamless; the response to joystick movement—crisp. This is a game that relies more on good hand-eye coordination than fast reflexes—timing is everything.

Rastan autoboots on a 128 and then configures the computer, via software commands, to 64 mode—that's a nice touch. Another plus is that the player is given the choice of music or sound effects during game play.

Regrettably, however, Rastan returns to the days of heavy-duty copy protection. Although my 1541 drive's heads may not be in perfect alignment (whose are?), Rastan is the only piece of software I have that won't load. It loaded from both of my 1571 drives, but only after I removed my 128's RAM expander. Rastan also failed to load with a fast load cartridge.

One other minor complaint involves the names of the enemies. Most are given names of creatures associated with terror or evil. However, two names, the "many armed bug" and the "fish," seem to indicate that the authors ran out of imagination. Those names just don't cut it for a deadly daddy long-legs and a killer carp.

Pleasant to look at and a pleasure to play, Rastan is an arcade game for those who want a program that requires more than just a fast thumb and a strong joystick. *(Taito Software, Inc., 267 West Esplanade, North Vancouver, British Columbia, Canada V7M 1A5. C-64/$34.95.)*

—MICHAEL CAVANAUGH

BOOT CAMP ..... C+

A military training and combat game for one or two players, Boot Camp turns your joystick into a physical development tool. Certain parts of this game require you to furiously waggle your joystick, and it is the speed of your waggle that determines your success in completing Chin Ups, the Assault Course and the Iron Man Race. Exhaustion and non-completion of sections send you back to the Assault Course to begin all over again.

I would've rated Boot Camp higher if starting over at the beginning hadn't been mandatory. I found it tiring and unrealistic not to be able to choose one event and stick to it.

The game's graphics stand out with sharp, realistic detail and good sound effects, ranging from "gung-ho"-type music to grunts and thuds.

I don't recommend this program to "couch potatoes." However, if you own a joystick with a good hand grip, and if you love a grueling workout, then go ahead, make your day! *(Konami, Inc., 815 Mittel Drive, Wood Dale, IL 60191. C-64/$29.95.)*

—JOHN DIPRETE

ENLIGHTENMENT ..... C–

There's a lot of "good stuff" in Enlightenment: fast action, a challenge for quick reflexes and a colorful terrain. I can't ignore a host of wonderful spells, 15 difficulty levels or the two-player feature. And, the graphics deserve passing grades while the musical interludes offer beautiful Canterbury themes.

However, I didn't like several aspects of Enlightenment. You start the game as a Druid and only get one chance as that character. Unfortunately, I sometimes died while simply standing around, debating my next move.

Joystick control lacks some precision. I had to position myself exactly on a spell site, sometimes over and over again before I could pick up a spell.

The game doesn't proceed in real time. After you've eaten a meal, you're suddenly informed that you need more food. A few seconds pass and you're told it's chow time again. Apparently, a Druid eats a million square dinners a day!

Some folks might like this game, but players looking for more direct adventuring would probably prefer something else. *(Rainbird Software; distributed by Mediagenic, 3885 Bohannon Drive, Menlo Park, CA 94025. C-64/$19.95.)*

—JOHN DIPRETE

TICKET TO HOLLYWOOD ..... B

Blue Lion Software has transformed movie lore into a computer trivia contest.

The game's graphics are well-drawn, although not very elaborate, and the sound effects are also rather limited. However, these sensory elements adequately fulfill their "supporting roles" as decorations for the quizzes.

The software tests you on an interesting array of facts—some easy, others rather obscure. Unfortunately, some players will quickly be able to memorize most of the game's answers, although the different types of questions do give the program more staying power.

The most impressive feature of this game is undoubtedly its control system. Primarily based on menus that are accessed by keyboard, joystick or mouse, it makes the game fun and extremely user-friendly. A Save function that keeps track of the progress of up to eight players is also included.

A few older copies of Ticket to Hollywood have one minor flaw that involves obtaining the final clues. Owners of software with this problem can find the clues by merely going to the game's review screen or getting a free replacement disk from Blue Lion.

This program should fascinate anyone who has even a casual interest in films. And, judging by the continuing boom in video rentals, that audience probably includes most C-64 owners. *(Blue Lion Software, 90 Sherman St., Cambridge, MA 02140. C-64/$29.95.)*

—WALT LATOCHA ■

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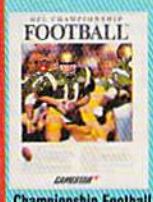

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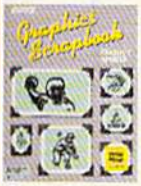

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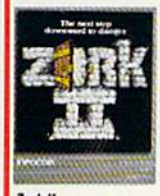

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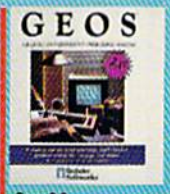

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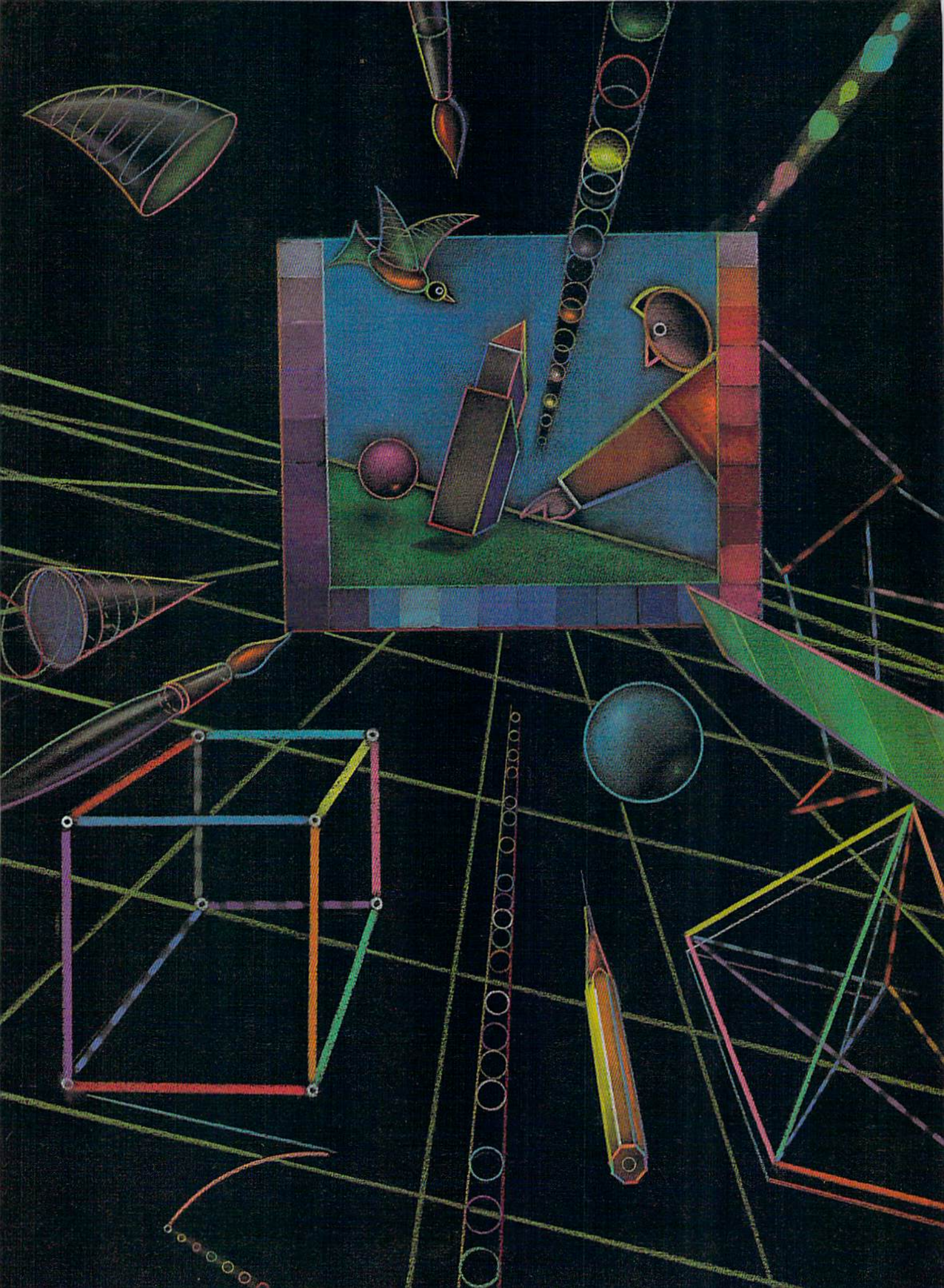
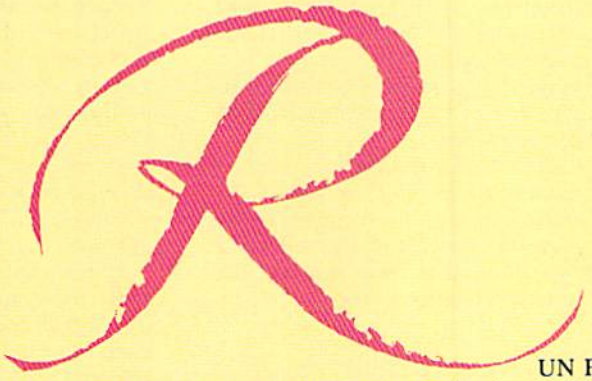


RUN Paint

Here is easily the most advanced, powerful and easy-to-use draw and paint program ever published in a magazine for the C-64 or C-128.



RUN Paint is a sophisticated, joystick-based paint program that lets C-64 and C-128 users create and print out bit-mapped graphics. It runs in 40-Column mode and uses both hi-res and multicolor screens. An easy-to-use system of nested, pop-down menus makes it unnecessary to study and memorize sets of complicated commands or to continually refer to the documentation.

Getting Started

RUN Paint is presented here as four program listings. Before using the program, you'll need to type in all four listings (use *RUN*'s Checksum program) and save them to a disk that we suggest be new and freshly formatted. All the listings are in a hexadecimal data format. It is important to name them only as indicated and not as the actual programs that they will create. So Listing 1 should be saved to disk with the name LISTING1, Listing 2 as LISTING2, and so on.

Once you've typed in all four programs, you can begin to create the actual RUN Paint files. (Make sure the Checksum program has been disabled before running any other programs.) Load LISTING1 and, with your RUN Paint disk in the drive, run it. Your disk light will come on, and there will be a brief amount ►

By ROBERT ROCKEFELLER

RUN it right: **C-64 or C-128 (in 40-Column mode); joystick or 1351 mouse**

ILLUSTRATED BY ANDRZEJ DUDZINSKI

of disk activity while it creates the actual RUN Paint file.

After a few minutes, you'll get your cursor back, and the familiar READY prompt will appear. Repeat this for LISTING2 through LISTING4. Depending on the size of the listing, the time required to create the files on disk will vary. Just be patient and wait until the READY prompt reappears.

The two main drawing tools are the pen and the brush.

Before starting to use RUN Paint, make sure you have a joystick or 1351 mouse plugged into port 2 (do not plug them in with the power on). Then turn on the computer. RUN Paint defaults to a joystick in port 2, so if you're using a 1351 mouse instead, press the F3 key at this point. Pressing F1 will reselect the joystick.

To start RUN Paint in either 64 or 128 mode, just load the program called RUNPAINT and run it. After half a minute or so, the screen clears and a flashing arrow appears in the center. The arrow is a pointer that you move around with the joystick or mouse to make menu selections and to draw on the screen.

The rest of this article will take you step by step through each of RUN Paint's functions. By the time you've finished, you'll have a good working knowledge of the power and sophistication of this program. After that, you can use the documentation as a reference guide.

The Menu System

You can't draw anything until you select an option from a menu. To activate the menu system, move the pointer at least five pixels above the top of the screen border and press the firebutton. When the main menu appears, select one of the options thereon by moving the pointer onto it and pressing the firebutton. This operation is known as "clicking." Take care not to move the pointer off the menu until you're finished with it, because the menu will then disappear.

Clicking an option displays a submenu from which you can make further selections. Some of the submenu options perform an action, and some make yet another submenu pop down. Accessing some of RUN Paint's features requires descending through three levels of submenus.

Many of the program's menus include an option that's indented two spaces, possibly with an asterisk beside it. These are options you can click on and off. The asterisk means the option is turned on.

The Main Menu

The main menu contains six options and four arrows. The latter are "scroll arrows" that you use to move the screen within the page buffer (see below). To observe these arrows in action, draw something on the screen. Here's how:

Activate the menu system by clicking on the Draw option in the main menu; then, when a submenu appears, click the Freehand option. Note that making a selection may make the menu disappear.

Now, position the pointer on the arrow pointing right and press the firebutton. This will make the contents of the screen seem to scroll left, because the screen is being moved to the right through the page buffer. Releasing the firebutton stops the scrolling and makes the main menu reappear. There are arrows corresponding to the other three directions also, but the up and down arrows are nonfunctional on the C-64 because of insufficient memory.

Following is an explanation of the functions accessed through each of the six main menu options.

The Pen Submenu

The two main drawing tools in RUN Paint are the pen and the brush, and the various options associated with them are controlled through the Pen submenu. There are six different pen styles, and an unlimited number of brush shapes and patterns are possible, since RUN Paint allows saving and loading of brushes and patterns. Brushes work by painting the part of the screen covered by the brush with the current pattern whenever the firebutton is pressed. Here's an example:

Activate the menu system, click on Pen, then move the pointer down to Use Brush and click on a brush for drawing. Next, move the cursor back onto the main menu and click on Draw, followed by Freehand. When you move the brush around while pressing the firebutton, the current brush pattern appears wherever the brush goes. RUN Paint lets you select from 11 different brushes and 35 different patterns at any one time.

Following are descriptions of the options in the Pen submenu:

Select Color lets you choose the color you want to draw with. When you click on a color, the border color changes to your choice to indicate the current drawing color.

Use Pen and **Use Brush**, which specify the pen or the brush for drawing, are mutually exclusive; if you select one, you deselect the other. An asterisk is always present beside the currently selected tool. The drawing modes in which you can select either pen or brush are Freehand, Lines, Rays, Spray, Ellipse and Box. Flood always uses the pen, regardless of which tool you've selected.

Affect Color. This option is either on or off. When it's off, none of RUN Paint's graphics commands affect color memory. If you want to use a Monochrome mode, just turn off Affect Color after activating the program.

Reflect On simultaneously creates up to three mirror images of an object as you're drawing it. Here's an example:

Enable the menu system, click on Pen, then on Set Reflect and on X in the Set Reflect submenu. Next, return to the Pen submenu and activate Reflect On. Now move back to the main menu and click on Draw, then on Freehand. As you move the pointer around while pressing the firebutton, you can verify that a mirror image is

drawn, reflected in the x-axis. Try the other options in the Set Reflect submenu, namely Y and XY. (See Set Reflect and Move Mirror, below.)

Set Reflect displays a submenu of reflection modes you can choose from when Reflect On is enabled. X produces reflection on the x-axis, Y on the y-axis and XY in the opposing quadrant. (Also see Reflect On, above, and Move Mirror, below.)

Move Mirror is the option you use to position the reflective x and y axes anywhere you want on the screen.

Select Pen lets you choose one of six pens for drawing when the Use Pen option is on. The first option draws normal solid lines and the second draws double-width solid lines. The third to sixth options produce one of four styles of dotted lines. In Freehand mode, only solid lines can be used. The dotted lines work only in the Lines and Rays modes.

Select Brush lets you choose a brush shape to use when Use Brush is on. Just click on a brush.

Select Pattern lets you choose a pattern when Use Brush is on. Just click on any pattern.

The Draw Submenu

The Draw submenu is used more frequently than any of the others, since it contains most of the commands for placing graphics on the screen.

Alter Color changes colors on the screen. You'd use it, for example, if you drew a flower with white petals and then decided it would look better in red. Selecting Alter Color brings up a submenu containing two options: **Card** and **Screen**. Card restricts the color change to a single card (see Technical Notes, below), which you select with the pointer. Screen makes the color change affect the entire screen. After selecting one of these options, a third submenu pops down from which to select the new color. In our example, you'd select red.

Once you select a color, the menus disappear, the border color changes to the color you selected and you're ready to initiate the color change. Position the tip of the pointer over the color you want to alter and press the firebutton. The border color changes to match the color of the pixel under the pointer. If this is indeed the color you wish to change, press the firebutton and the change takes place.

If nothing happens, you probably have the pointer positioned on a blank pixel. Move the pointer a little bit and try again. If the pointer is placed on the wrong color, you can abort the change by executing an Undo (see below) or by activating the menus, then moving the pointer off the menus back onto the screen to try again.

Wash lets you change the background color on a card-by-card basis in Hi-Res mode. When you select Wash, a menu pops down from which to choose the new color. After you select a color and the menus disappear, move the pointer onto a card and press the firebutton to change the backgound color of that card.

Flood fills an enclosed area with a solid color. Here also, a menu pops down from which to select the color you want, and the menus disappear after you choose. Then position the pointer over the area you want to fill and press the firebutton. You can abort a fill in progress by executing an Undo (see below).

Freehand makes a freehand drawing. Pressing the firebutton while moving the pointer around draws a line. (See the Pen submenu, above.)

Lines is the option used for drawing straight lines. Position the pointer where you want a line to start and press the firebutton; then move the pointer to the line-end position and press and hold down the firebutton until the line is completely drawn. (See the Pen submenu, above.)

Rays draws lines that radiate from a common origin. Move the pointer to the desired starting point and press the firebutton; then move the pointer to a line-end position and press the firebutton again to draw the line. Draw additional lines by moving the pointer to new end positions and pressing the firebutton again. As in the Lines option, you must hold the firebutton down until the line is complete. (See the Pen submenu, above.)

Spray produces a spray effect. When you select this option, a submenu pops down with three additional choices—Light, Medium and Heavy—which specify the intensity of the spray effect.

Spray uses either the pen or the brush and works on a timer. In Heavy mode, it plots a point or paints a brush shape every $^{2}/_{60}$ of a second. The corresponding times for Medium and Light modes are $^{5}/_{60}$ and $^{15}/_{60}$ seconds, respectively.

If Use Brush is on, you can get an airbrush effect by selecting a brush consisting of a grid of dots. (See Select Brush, above.)

Eraser mode erases the screen card by card.

Edit lets you modify either a section of the screen, the brushes, the patterns or the current character font. Selecting Edit displays a submenu. To modify a section of the screen, click on Pixel Edit. After your selection, the menus vanish and the pointer appears, surrounded by a flashing box. Position the box over the part of the screen you want to edit and press the firebutton. This enlarges the screen inside the box, copies it to the bottom of the display, and then brings a color menu to the center of the display, from which you select a new drawing color. The top of the display shows an unmagnified section of the screen, so you can see the effect of your edits.

You edit pixels by positioning the pointer over them and pressing the firebutton. To erase a pixel, set the drawing color to the screen color. You can select a new area to edit by moving the pointer to the top of the screen and pressing the firebutton.

The Font, Brush and Pattern editing modes operate in a similar manner. After selecting one of them, the screen clears and the font, brushes or patterns are copied to the top of the screen. Select a character, brush or pattern for editing by clicking on it. The center of the screen shows a color bar containing two colors: blue and black. Select blue to erase pixels and black to set pixels. ►

RUN Paint can load standard Commodore character sets.

You select a different character, brush or pattern to edit by moving the pointer into the top area of the screen and pressing the firebutton.

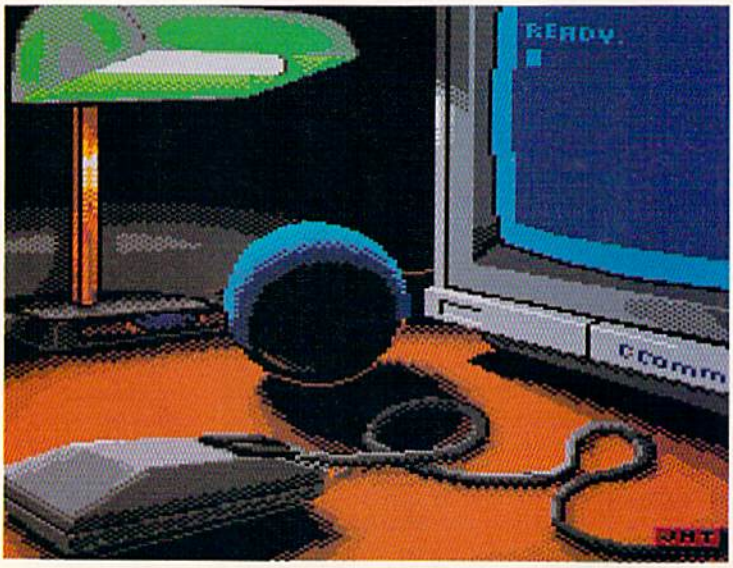
Ellipse uses either the pen or the brush to draw ellipses. Click twice to set two opposing corners of a box, and an ellipse will be drawn within the box. (See Solid, below.)

Box uses either the pen or the brush to draw boxes. Click twice to set two diametrically opposite corners, and a rectangle appears. (See Solid, below.)

Solid determines how Ellipse and Box work. When this option is on, ellipses and boxes are drawn filled-in. When it's off, they appear as outlines.

The Shape Submenu

The Shape submenu contains commands for cutting and pasting or erasing rectangular areas of the screen, along with whatever is within those areas. It uses a special area of memory called the "shape buffer," where shapes you cut or copy from the screen are stored. In Paste mode, the shape in the buffer is pasted on the screen. Note that it's impossible to paste a hi-res shape on a med-res (multicolor) screen, or vice-versa.



James Hastings-Trew produced this still-life picture using RUN Paint.

Cut duplicates a rectangular area and its contents from the screen to the shape buffer and erases it from the screen. Move the pointer to one corner of the shape and click, then to the opposite corner and click again.

Copy copies a shape on the screen into the shape buffer, but the shape remains on the screen. Execute this exactly as you would Cut.

Paste places a shape that's in the shape buffer onto the screen. In this mode, the pointer is surrounded by a box of the same size as the shape in the buffer. Move the box to where you want it located and click once. Note that it's impossible to paste a hi-res shape on a med-res (multicolor) screen, or vice-versa.

Erase eliminates the contents of a rectangular portion of the screen. Move the pointer to one corner of the rectangle and click, then move it to define the opposite corner and click again.

Flip X. When this option is on, the shape is pasted and flipped horizontally about the y-axis.

Flip Y pastes the shape and flips it vertically about the x-axis.

RVS pastes the shape in reverse field. This option works well in Hi-Res, but not so well in Med-Res (Multicolor) mode.

Cover mode makes the shape completely cover the screen area where it's pasted. Normally, blank areas of the shape are not pasted.

The Type Submenu

The Type submenu is used to place text on the screen. Type is essentially monochrome and uses the current color.

Font. Clicking this option selects a new character font and enables Type mode. After you click, a submenu will appear offering an additional three options. The first corresponds to the RAM font, which RUN Paint can load in via the Load submenu (see Disk, below). If this option is blank, a font hasn't been loaded yet. RUN Paint can use either standard Commodore 8-bit character sets or special RUN Paint fonts, which are 16 bits wide and 16 high.

Graphics, the second Type option, selects the built-in ROM character set that consists of the uppercase alphabet and special graphics characters.

Text, the third option, selects the ROM character set containing the upper- and lowercase alphabets and business graphics characters.

After clicking on an option, you can begin typing. A flashing box shows where the next character will appear, and, when you press the firebutton, you can move this box anywhere you wish on the screen. Press the firebutton again after the box is positioned. The following are special features available while typing:

Cursor keys: Move the flashing box around.

Control/RVS On: A standard Commodore character set has 256 characters, numbered 0–255, but RUN Paint can use only 128 characters at a time. Simultaneously pressing the control and 9 keys selects characters 128–255 for typing.

Normally, characters 128–255 are just reversed images of characters 0–127, and Commodore uses them to provide a flashing cursor. RUN Paint doesn't need these reversed characters, so they can be replaced by another font, such as italics. This lets two 8-bit character sets reside in memory at once. RUN Paint provides no way to replace the reversed characters.

Control/RVS Off: Simultaneously pressing the control and 0 keys selects characters 0–127 for typing.

Home: Moves the typing box to the home position.

Return: Moves the typing box to the start of the next line.

DEL: Pressing the insert-delete key deletes the character to the left of the cursor.

Now, getting back to the Type submenu:

Width displays a submenu with three options: Normal, Double and Quadruple. Click on the character width you want.

Height also produces a choice of Normal, Double and Quadruple. Click on the height you want.

The next five options, affecting how text is placed on the screen, are mutually exclusive; only one can be activated at a time.

Cover, which is the Default mode, makes characters you place on the screen completely cover the area inside the typing box. In this mode, it's impossible for you to make a character blend in with the background.

RVS is similar to Cover, except that characters are reversed before being placed on the screen.

Or places characters on the screen using the logical Or operation, thus letting them blend in with the background.

And. When this option is selected, characters are placed on the screen using the logical And operation. To see how this works, paint the entire top of the screen with a pattern using a large brush, then select the Quadruple option and the And option on the Type submenu. Now choose one of the fonts, position the typing box on the pattern and begin typing.

XOr lets you place selected characters on the screen using the logical Exclusive-Or operation. This means the characters can blend in with the background.

The Disk Submenu

The Disk submenu is used to save and load files to disk, as well as to issue disk commands and select the disk device number. RUN Paint filenames must not contain any spaces.

Load. This option on the Disk submenu can load a number of types of files, which are selected from a submenu. After you select a file type, RUN Paint displays a list of the files of that type available on the disk. Just move the pointer onto the filename you want and press the firebutton.

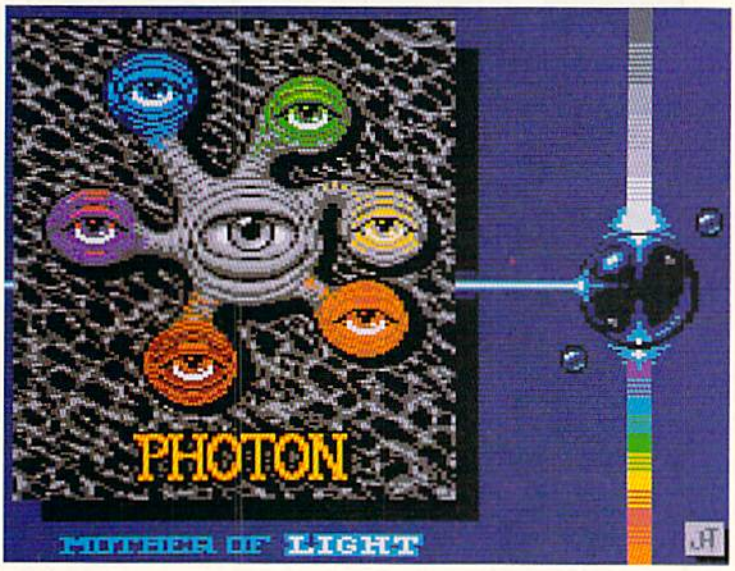
RUN Paint can load standard Commodore character sets, as well as files created with other programs, such as Koala Painter, Doodle! and Flexidraw. These files must be renamed to conform with RUN Paint format. (See Load Font, Monochrome, Hi-Res Screen and Med-Res Screen, below.)

Use the **Font** option in the Load submenu to load a font. As mentioned above, RUN Paint can use standard Commodore character sets. However, the file must be renamed according to RUN Paint format before the program can load them. All RUN Paint font filenames must begin with the letters RPF and a period. For example, a character set named ITALICS would have to be renamed RPF.ITALICS. Remember, no spaces are allowed in a filename.

The **Page** option loads an entire page, **Shape** loads a shape, **Patterns** loads a set of patterns and **Brushes** loads a set of brushes.

Monochrome provides a way to load a straight 8K monochrome bit map with no color. Flexidraw saves pictures in this format. Before you can load a Flexidraw picture into RUN Paint, you must rename it. For example, a Flexidraw file named JAGUAR would have to be renamed RPO.JAGUAR. Once again, there can't be any spaces in the filename.

After loading a monchrome bitmap, RUN Paint enters a special mode where you can copy a section of the screen to the shape buffer. If you go to a menu, the screen is copied to the page buffer. If you perform an Undo, the screen will go back to what it was before loading. ►



Photon-eye, created with RUN Paint by James Hastings-Trew.

Glass and coaster, by James Hastings-Trew.

Hi-Res Screen loads high-resolution screens that include color, such as Doodle! picture files. As with Flexidraw files, Doodle! files must be renamed to RUN Paint format before they can be loaded. A Doodle! file named DD.FIELD would be renamed RPH.FIELD.

Also as with Flexidraw files, after loading, RUN Paint enters a special mode enabling you to copy a section of the screen to the shape buffer. If you go to a menu, the screen is copied to the page buffer, and performing an Undo restores the screen as it was before loading.

Med-Res Screen loads medium-resolution (multicolor) screens, such as Koala picture files. Like the other file types I've mentioned, Koala files must be renamed according to RUN Paint format before they can be loaded. A Koala file named APIC A FIELD would be renamed RPM.FIELD.

As with the previous two commands, RUN Paint enters a special mode where you can copy a section of the screen to the shape buffer. Going to a menu copies the screen to the page buffer, and an Undo restores the screen as it was before loading.

The **Utility** option enables RUN Paint to load in and execute user-defined, machine language utility programs that can give RUN Paint more capabilities. The programs must be assembled to run at address $6C00, and their filenames must begin with the letters RPU and a period.

Save. This option on the Disk submenu displays a further submenu from which various types of files can be saved. After selecting a file type, enter the desired filename, omitting a prefix, since RUN Paint will install it automatically. For example, if you enter ITALICS as the name of a font, RUN Paint will save it as RPF.ITALICS. As before, don't include any spaces in the filename.

There are eight commands for saving files, representing eight different file types. **Font, Page, Shape, Patterns** and **Brushes** are self-explanatory. **Monochrome** saves the contents of the screen as a straight 8K monochrome bit map with no color. **Hi-Res Screen** saves the contents of the screen as a Doodle!-compatible file. **Med-Res Screen** saves the screen as a Koala-compatible file. After you enter the filename for a med-res screen, the text screen will fill with strange colors. Don't worry. This is just because the text screen and the med-res screen share the same color memory.

Other Disk submenu options are:

Command. Select this option from the Disk submenu to issue a command to the disk drive for formatting a disk or scratching or renaming a file.

Set Device lets you specify device 8 or 9 for saving and loading.

The Mode Submenu

The Mode submenu is a catch-all for commands that don't fit in anywhere else. It lets you set the screen and pointer color, print, select high or medium resolution, and more.

Cursor. This Mode submenu option displays a further submenu that offers three options: Solid, Flash and Card Restricted. **Flash**, the default, produces a flashing cursor. With **Solid**, you get a nonblinking cursor. You must also select the cursor color from a submenu. **Card Restricted** restricts cursor movement to coordinates that coincide with the upper-left corner of a card. This is often useful in Type mode and when pasting shapes.

Screen Color displays a submenu from which to alter the screen color. The color is actually changed for the entire page, not just the screen, and on the C-128 this takes a second or two. The change isn't finalized until the cursor is moved off the Screen Color submenu.

GoTo. This Mode submenu option lets you move around the page buffer quickly. On the C-64, three options are available in this submenu: Left, Middle and Right. On the C-128, you have an additional four options: Top, Bottom, Screen Up and Screen Down. As mentioned above, the page buffer is wider than the screen. In fact, it's 80 cards wide. Clicking on **Left** brings columns 0–39 of the page buffer to the screen. **Middle** and **Right** display columns 20–59 and 40–79, respectively. Clicking on **Top** moves the screen to the very top of the page buffer on the C-128. **Bottom** moves the screen to the bottom of the page buffer. **Screen Up** and **Screen Down** move up and down through the page buffer approximately half a screen at a time.

Clear Screen. This option in the Mode submenu predictably clears the screen. This action can be reversed with an Undo command.

Clear Page clears the entire page and cannot be undone.

Print. Various printout options are accessed through this submenu. They let you print part or all of a screen or page.

Screen prints just what is currently displayed. If the Define option (see below) is on, you can specify the number of screen lines to print. If Define is off, the full screen is printed.

Page prints the page buffer. Similar to printing a screen, if the Define option is on, you can specify the number of lines to print from the page. If Define is off, the full page is printed.

Rectangle defines a rectangular area of the screen to be printed. This area can be as large or as small as necessary. After the menus disappear, click once to define one corner of the rectangle, then move the pointer to define the diametrically opposite corner and click again to start printing. Rectangle doesn't work with the Prowriter printer.

RVS. If this is set to on, the printout will be in reverse field.

Disk. When Disk is on, the printer output will be sent to the disk. You must enter a disk filename before printing begins.

Define works with Screen and Page, but not Rectangle. As mentioned above, this option lets you define the number of lines to print from the screen. After you choose to print a screen, the menus disappear and a horizontal line appears. Move the line to define the bottom of the part

The Mode submenu is a catch-all for commands that don't fit in anywhere else.

of the screen you want printed and press the firebutton. The screen will be printed from the top down to the line.

You can also define the bottom line when you print a page, but printing takes place from the top of the page buffer down to the line. You can use ScreenUp and ScreenDown to position the screen in any part of the page buffer on the C-128.

Click on **Select Printer** to tell RUN Paint what type of printer you have. The program supports three printers and their compatibles: the Commodore 1515, the Epson and the C.Itoh Prowriter. If you have one of the printer interfaces that offer 1515 emulation, you should be able to use the 1515 printer driver, regardless of the type of printer you own.

Click twice on **Quit** to leave RUN Paint and return to Basic. On the second click, press the button for at least a second.

Use the **Device** option to tell RUN Paint whether you're using a joystick or a mouse.

Hi-Res and **Med-Res** specify either High Resolution or Medium Resolution mode. These options are mutually exclusive; selecting one unselects the other.

The Undo Feature

I'll wrap things up with a look at RUN Paint's most useful feature: Undo. Undo is not selected through the menu system, so I'll illustrate it with an example. Draw something on the screen, then activate Undo by moving the pointer five pixels below the bottom border of the screen (as far down as it will go) and pressing the firebutton. The screen will clear, "undoing" the last function performed.

Each time you access the menus, the screen's contents are copied to the page buffer, and Undo works by copying the page buffer back to the screen. This means you can reverse any action performed since the last time the menus were accessed.

Technical Notes

The VIC chip in the C-64 and C-128 organizes the graphics screen into little rectangles called "cards." The screen contains 25 rows of cards, with 40 cards per row. In Hi-Res mode, each card contains eight pixels horizontally and eight pixels vertically, and only two colors are possible per card: a foreground color and a background, or screen, color. If you try to add a third color to a card, the foreground color will change to the new color.

In Med-Res mode, also called Multicolor mode, three different foreground colors are possible per card, and the background color is the same for all cards. The luxury of having three foreground colors is paid for by decreased screen resolution. The pixels are twice as wide as in Hi-Res mode, and a card contains only four pixels horizontally by eight vertically.

The Page Buffer

RUN Paint uses the screen as a window atop a larger area, referred to as the "page buffer." On the C-64, RUN Paint can handle drawings up to 640 pixels wide and 200 pixels high. With its larger memory, the C-128 can handle a full $8\frac{1}{2} \times 11$-inch page, allowing drawings of up to 640×792 pixels. R

Robert Rockefeller is probably best known to RUN *readers as the creator of our fine word processing program, RUN Script, for both the 64 and 128.*

Listing 1. Create RUN Paint boot program. (Note: RUN Paint's listings are available on the RUN Works and March-April ReRUN disks.)

```
Ø REM CREATE RUNPAINT BOOT PROG
  RAM                    :REM*11
5 OPEN 8,8,8,"RUNPAINT BOOT,P,W
  "                      :REM*85
1Ø READ A$:IF A$="-1" THEN CLOS
  E8:END                 :REM*78
15 IF LEN(A$)<62 THEN 55
                         :REM*254
2Ø B$=MID$(A$,1,2Ø)+MID$(A$,22,
  2Ø)+MID$(A$,43,2Ø)     :REM*242
25 FOR I=1 TO 3Ø         :REM*181
3Ø C$=MID$(B$,(I*2)-1,2):H$=LEF
  T$(C$,1):L$=RIGHT$(C$,1)
                         :REM*2Ø9
35 H=VAL(H$):IF H$>"9" THEN H=A
  SC(H$)-55              :REM*85
4Ø L=VAL(L$):IF L$>"9" THEN L=A
  SC(L$)-55              :REM*136
45 BY=H*16+L:PRINT#8,CHR$(BY);
                         :REM*67
5Ø NEXT:GOTO 1Ø          :REM*115
55 IF LEN(A$)<21 THEN B$=A$:GOT
  O 7Ø                   :REM*184
6Ø IF LEN(A$)<42 THEN B$=LEFT$(
  A$,2Ø)+RIGHT$(A$,(LEN(A$)-21
  ):GOTO 7Ø              :REM*137
65 B$=LEFT$(A$,2Ø)+MID$(A$,22,2
  Ø)+RIGHT$(A$,LEN(A$)-42)
                         :REM*14Ø
7Ø FOR I=1 TO LEN(B$)/2:REM*221
75 C$=MID$(B$,(I*2)-1,2):H$=LEF
  T$(C$,1):L$=RIGHT$(C$,1)
                         :REM*14Ø
8Ø H=VAL(H$):IF H$>"9" THEN H=A
  SC(H$)-55              :REM*56
85 L=VAL(L$):IF L$>"9" THEN L=A
  SC(L$)-55              :REM*84
9Ø BY=H*16+L:PRINT#8,CHR$(BY);
                         :REM*148
95 NEXT:GOTO 1Ø          :REM*16Ø
1ØØ REM HEX DATA FOR RUNPAINT B
  ASIC BOOT PROGRAM      :REM*65
1Ø1 DATA Ø11C191CØAØØ8F2Ø4453 4
  15645224Ø52554E2Ø5Ø 41494E5
  422ØØ3B1C14ØØ          :REM*116
1Ø2 DATA 8F2Ø424F4F542Ø5Ø524F 4
  752414D2Ø464F522Ø52 554E2Ø5
  Ø41494E542EØØ          :REM*16Ø
1Ø3 DATA 821C1EØØ8B2Ø41B23Ø2Ø A
  72Ø41B2313A2Ø932232Ø 3A53595
  32E5354554646          :REM*195
1Ø4 DATA 2E48222C382C313A2Ø8F 2
  Ø4C4F41442Ø48495245 532Ø425
  255534845532C          :REM*168
1Ø5 DATA 2Ø5Ø41545445524E532E Ø
  ØA61C28ØØ433634B2AB 313A2Ø8
  B2ØC228363535          :REM*177
1Ø6 DATA 333229B3B132323262ØA7 2
  Ø433634B23ØØØB51C32 ØØ8B2Ø4
  336342ØA72Ø38          :REM*1Ø3
1Ø7 DATA 3ØØØEC1C3CØØ8B2ØCC28 2
  E29B2352ØA72Ø992293 111122C
  7283135292245          :REM*157
1Ø8 DATA 4E41424C452Ø343Ø2Ø43 4
  F4C554D4E2Ø4D4F4E49 544F522
  23A8ØØØ6Ø1D46          :REM*98
1Ø9 DATA ØØDE2Ø3Ø3A2Ø972Ø3235 3
  6342C3139323A2Ø972Ø 3231362
  C3235353A2ØFE          :REM*18
11Ø DATA Ø22Ø31353A2ØFE11224F 4
  22E424F4F542Ø525Ø22 2C5Ø28D
  128223Ø433Ø3Ø          :REM*231
```

Continued on p. 69.

RUN Paint Primer

To create a graphics masterpiece, you need a quality program (RUN Paint) and these hints from a professional computer artist.

RUN Paint (see previous article) for the C-64 and 128 is an easy-to-use and versatile art program, and, like all powerful utilities, it responds well to a little advance planning. As a professional computer artist, I'm always amazed at the impact, in time and results, that some careful forethought can have on a project. It can mean the difference between "just another computer picture" and that eye-grabbing display I've been striving to create.

Getting Started

Unlike many commercial draw and paint programs, RUN Paint offers the computer artist a choice of screen modes: High-Resolution (HIRES) mode, which produces the crispest screen images but severely limits the way you can apply color, and Multicolor (MEDRES) mode, which compromises the screen resolution but offers much more latitude in handling color.

Your choice will depend largely on your art experience and whether the image you plan to create is intended to appear on the screen or on paper. Since I came to computer art from a traditional oil background, Multicolor is the mode I almost always use.

Once you've set the Screen mode, it's time to select the background color for your piece, making sure that it complements the intended image. Some people pick the color that will cover the largest area in the picture; for instance, blue for a landscape with lots of sky. However, this is usually a mistake.

Instead, consider using a color that will be distributed evenly over the picture. Black is a great choice, as you'll almost always be using black to delineate objects, shade colors, and so on. White would be appropriate where you want to place a lot of highlights on objects for shiny effects. Dark or medium gray is good if you want a lot of muted colors. The choice of background color is a crucial one, because it will directly affect the ease with which your picture comes together.

Creating a Framework

RUN Paint's unique virtual-page feature is a great tool for composing a picture, and it provides room to maneuver in case you paint yourself into ►

By JAMES HASTINGS-TREW

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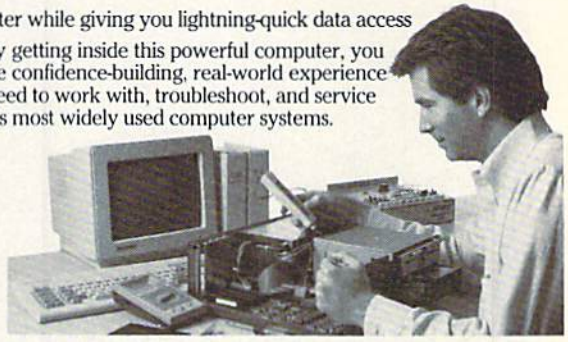

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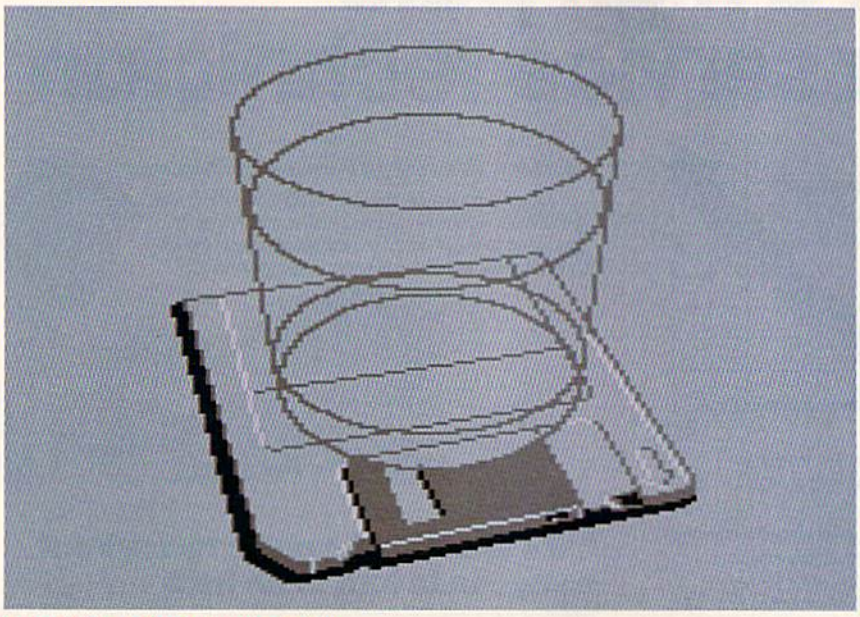

Figure 1. Example of a layout sketch.

a corner. I always move into the virtual-page area when I start a new picture; all it takes is a few presses on the down- and right-arrow keys.

Composition is to a picture as the framework is to a house: If the framework isn't sound, the house will never be right. Normally, you should lay out the entire composition of a computer painting before you begin to apply color, working out all perspective problems and object placements in the process. (See Figure 1 for an example of a layout sketch.)

Pick a simple color, such as dark gray; then, with the line tool, rough in the outlines. You can also use the ellipse and freehand tools to rough in shapes. Working with outlines, it's easy to correct layout mistakes, without ruining hours of work, by using a large brush shape in the background color.

If you find that you've placed your picture too high, too low, or too far to the left or right, use the arrow keys to move your window on the virtual page. This capability can save lots of work when you want to get an image positioned "just so."

Try to resist the temptation to "get in there" and start adding details at this point. Remember, you're creating the framework for your picture, so the screen should be uncluttered to make major changes easy. You need to be free to try out different ideas without worrying about spoiling hours of work. Keep the "precious" work until the end, when the framework is all but graven in stone and most of the colors and blendings are set.

Blending and Shading

Once you get the framework of your image together, it's time to color it in. If you're using Multicolor mode, this means first getting to know the color restrictions of that mode and the peculiar way it makes the colors interact on the screen. In this mode, you can have only four colors in any "place" on the screen at one time; if you try to add a fifth, one of the first four will change and several pixels may suddenly pop to the new color. I usually ignore color restrictions when I'm creating and deal with them only when necessary.

Of the four colors you can have in any place, one is always the background color. This means, for all intents and purposes, that when you're shading or blending, you'll be dealing with only three colors. A few combinations of the 16 colors in your Commodore palette provide blended effects that are especially nice.

To blend colors with RUN Paint, you can use a Zoom-mode technique called "dithering," which alternates two or more colors in a checkerboard pattern. When viewed on the screen, the colors will appear to blend into an in-between color. Bear in mind, though, that there is a price to pay with dithering. It lends a texture to the areas where it's used. A kind of clothlike softness is often the feel of a dithered area, so you should use it minimally when you're creating images of hard, shiny or rough surfaces. Figure 2 shows two images shaded with the same colors, but notice the textured effect that dithering has created in the image on the left.

There are several main groups of colors to keep in mind when blending and shading:

Black, dark gray, medium gray, light gray and white all fit into an excellent gray scale, which, when used properly, can produce very smooth blending effects.

Blue, light blue and cyan make a fairly short scale of blue values. However, you can create good in-between shades by dithering with one of the gray values. In a pinch, a very dark blue can be achieved by dithering dark blue with black, but the resulting area will have a definite texture.

Brown, red, orange and light red constitute a good scale of red colors. Highlights can be created in this scale with light gray or white, while dark and medium gray will produce shadow effects and muted shades. Yellow sometimes works with the red values as a highlight color and is a good way to get a better orange value. Light red and light or medium gray work well as flesh tones and combine into some smooth colors.

Green and light green are the only values in their very short scale. However, they work extremely well with all the grays, plus light blue and cyan, to create a wide and subtle range of colors

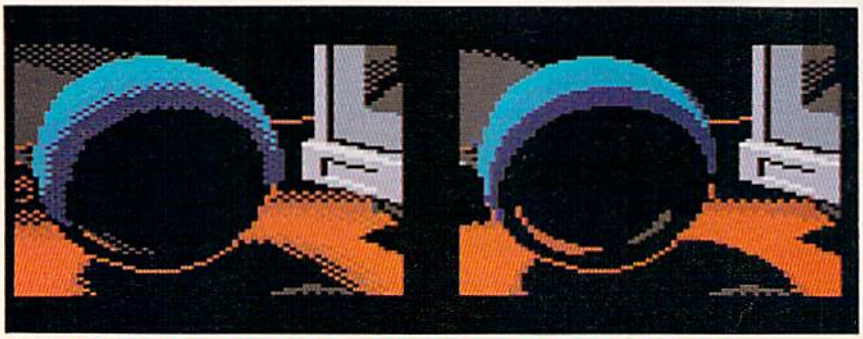

Figure 2. Example of the textured effect resulting from "dithering." The image on the left is dithered.

that show minimal texturing on the screen.

Purple seems to stand alone, but you can get surprising results by dithering purple with the gray colors. Purple and light red or light blue also yield interesting results.

Yellow, like purple, is a loner. A good light yellow can be achieved by dithering yellow with light gray or white.

Building Your Picture

In traditional oil painting, the artist often works from the background of the picture to the foreground, washing in the sky, clouds, hills and trees before painting in the people, horses and buildings. This makes sense when you're laying real paint down on a real surface, with later work lying on *top* of earlier work. In computer art you have a two-dimensional surface, and it makes more sense to render foreground objects first and then rough in the background. After all, you're most interested in the foreground objects, so, if you're going to have problems fitting in colors, you'd do better to make compromises in the background. Also, if you fill the background in first, you may find yourself fighting with those colors in order to do justice to your subject matter.

I concentrate on one image at a time as I build a picture, rendering it completely before moving on to the next. This is also the fastest way to work, since it minimizes moving the Zoom window around.

Patterns and Text

The pattern and text capabilities of RUN Paint work best in Hi-Res mode. When you're filling in a background with a repeating pattern, you'll get the most satisfying results by creating a small patch of pattern in Zoom mode and then using the Copy and Paste commands under the Shape menu. For text I also work in Zoom mode, which lets me create really nice letters.

Another trick in the computer artist's bag is anti-aliasing, a Zoom-mode technique for smoothing out the rough edges that the relatively coarse Multicolor-mode pixels can have, particularly on diagonal lines and curves. In anti-aliasing, you blend out the stairsteps of the edges by using colors with values between those of the object and its background. This technique works well with drawing text; just a pixel in an intermediate color at the corners of letters can really smooth out the curves and lines.

See Figure 3 for an example of a raw line and an anti-aliased version of the same line.

The Long View

The best way to get a good look at a work in progress is to occasionally get your face out of the monitor, rise from your chair and walk several feet away. You might turn your head upside-down, too; that's a great way to discover a flaw that you've grown used to seeing. If you don't get up and away from the monitor from time to time, you may end up with a picture that suffers from lack of contrast, poor composition, bad color balance or other deficiencies.

I also ask the opinions of other people when I'm near the end of a project. They often come up with surprisingly helpful ideas to tweak a good image into a fantastic one. A combination of these techniques helped me put together the images included with the RUN Paint article and on the magazine cover.

One of the best ways to learn new techniques for color blending, composition and anti-aliasing is to inspect images by professional computer artists. This is especially effective in Zoom mode, where the pixel magic is readily apparent.

I really enjoy computer art, and I hope the tips I've offered here will inspire your creativity, too. Just think, with your Commodore and RUN Paint, you may become a "digital da Vinci." ■

Canadian James Hastings-Trew is a professional graphics designer whose pictures and utility programs are well-known to users of the Graphics SIG on QuantumLink.

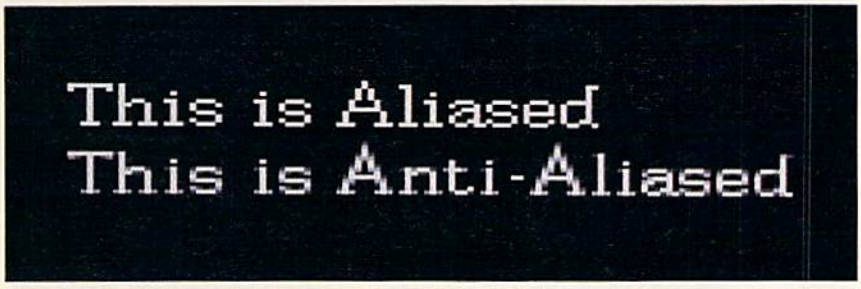

Figure 3. A raw line and the same line anti-aliased.

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Flight notes

5A

Exploring Japan with Jet (Part 2)- SubLOGIC's Jet program now includes a free Japan Scenery Disk. Last month we took you on a guided F-16 tour of Tokyo.

This month we'll follow the Japanese coastline on a cross-country flight from Tokyo to Osaka. Starting from Tokyo International Airport (coordinates North 18201, East 32787), take off and turn to a heading of 220 degrees until you reach the coast. Turn to a heading of 235 degrees and fly for about twelve minutes at five thousand feet altitude until you can see Hamamatsu Airport below you (see Tokyo area chart). Turn right again to a heading of 305 degrees and fly to Nagoya, another highly detailed city. At Nagoya, turn left to a 240-degree heading that will take you straight to Osaka. When you find yourself flying over Osakajo Castle, begin your descent for a landing at Osaka International. This entire flight takes only twenty five minutes at Mach 1.4.

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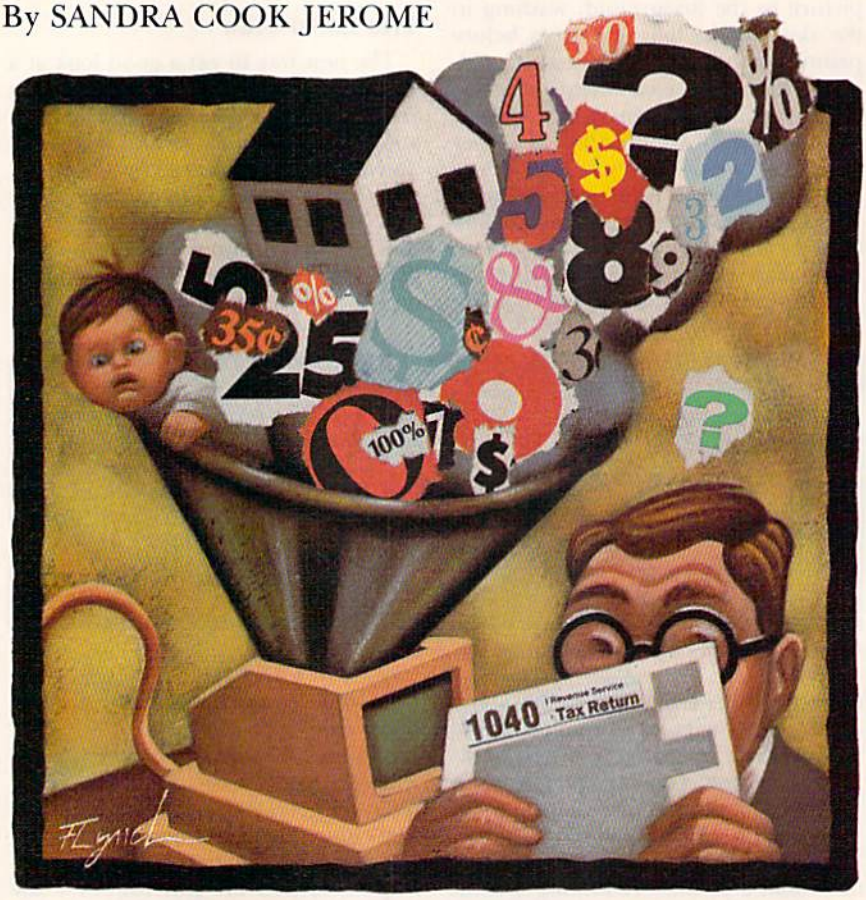
Many Happy Returns

Make tax-time as painless as possible with your Commodore and one of these tax-preparation programs.

By SANDRA COOK JEROME



Doing your income taxes after the Tax Reform Act of 1986 can be a long and tedious task, but now there's help for those who are overwhelmed with the complexity of the forms and schedules. This article reviews four Commodore-compatible tax programs available today, at least one of which should be suitable for your tax situation.

Each of the programs has features that are unique. Two are for the C-64 only, while the other two come in both C-64 and C-128 versions. Refer to Table 1 for a summary of program features and Table 2 for the manufacturers' addresses.

SWIFTAX

Swiftax, from Timeworks, is an easy-to-use program that's suitable for a simple tax return. It features pull-down menus, help screens and a pop-up calculator. You enter your wages, deductions and credits in any order, easily changing from one form to the next. Then, when all your information is in, it's ready to print directly on IRS forms or blank paper.

Swiftax has four pull-down menus: File, Print, Forms and Schedules. You use the File menu to change the general configuration, get an overview of 1988 changes, update the file and quit. The Print option lets you change the printer configuration.

The Forms and Schedules menus let you input most of your tax information. The first option in the Forms section is for entering taxpayer information such as filing status, address, number of children and wages. Next, you select specific forms or schedules to work on. If information is needed from another form (for example, adjusted gross income is needed from Form 1040 to complete computations in Schedule A), the program just skips that line. This is a nice feature, since without years of tax training, it's difficult to know which forms or schedules should be completed first. Because it calculates the tax, you can use Swiftax for tax planning or estimating, although some schedules or forms might be incomplete or missing.

Throughout the program, pop-up help and instruction screens appear when you press the Commodore and H keys simultaneously, and the function keys let you move from page to page, from top to bottom of the form, and back and forth between fields.

A nice improvement in the latest version of Swiftax is the built-in "fast-load" utility, which enables the program to load in 17 seconds, compared with over two minutes for the 1987 version.

The user's guide introduces the main functions of the program and contains a helpful chapter on simple steps to filing your tax return. It's not only an instruction manual, but a great tax guide as well.

Swiftax is not appropriate to the professional tax preparer, since it lacks important forms and schedules, such as Form 2119 (Sale of a Personal Residence) and Schedule E (Supplemental Income Schedule from Rents, Royalties and Partnerships). However, it is a worthwhile investment for preparing simpler tax returns or doing some tax planning. It's ►

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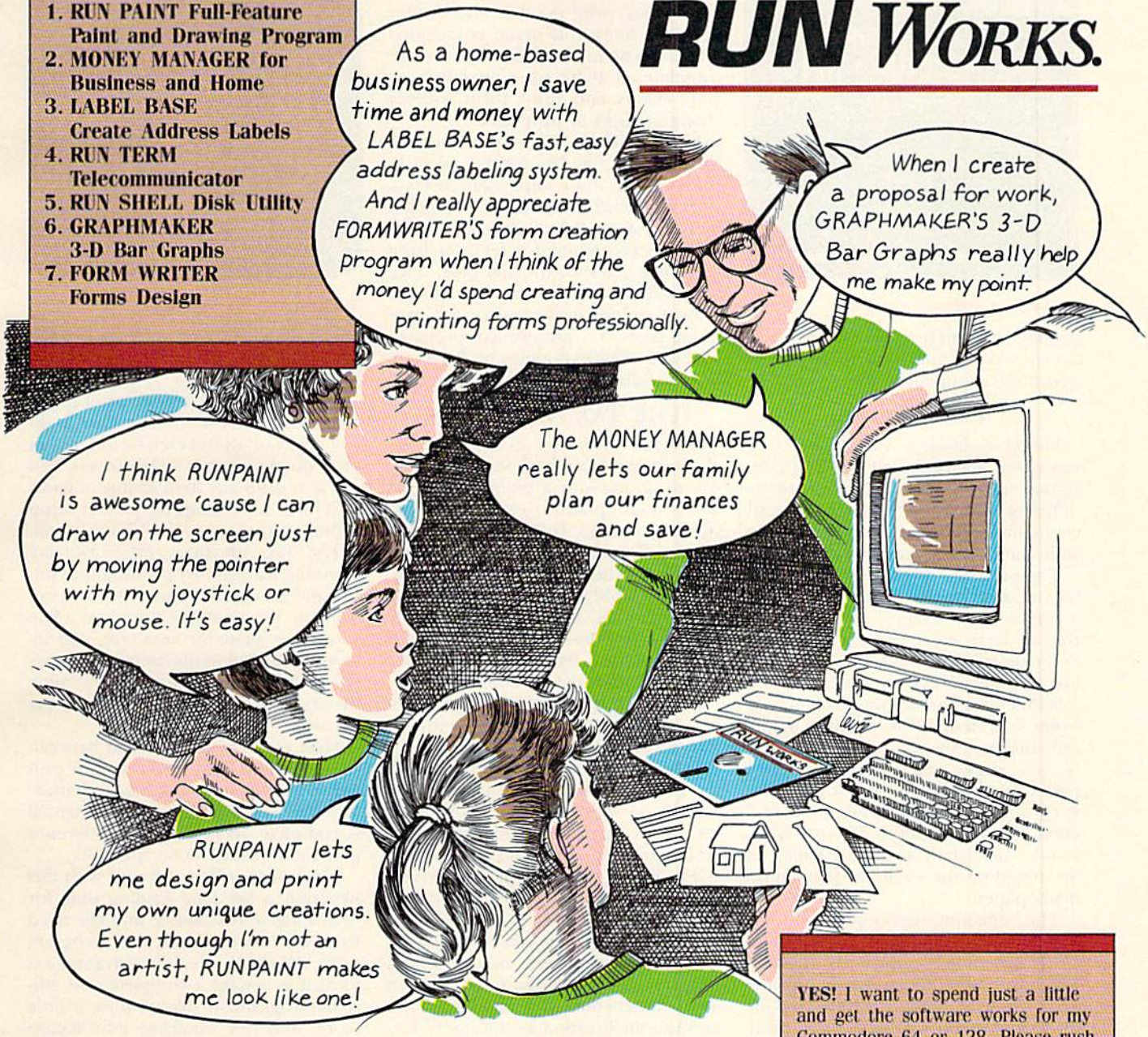
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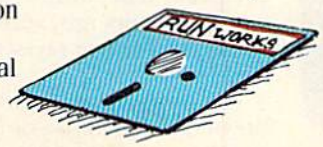

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Swiftax form selection menu.

definitely easy to use and a reflection of Timeworks' commitment to quality in personal computer software.

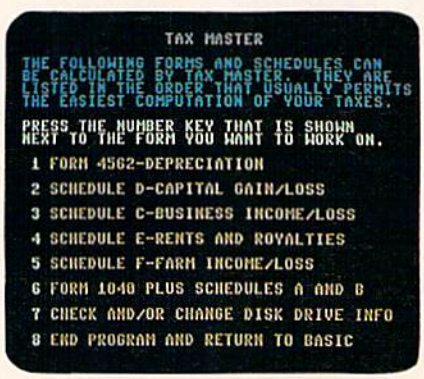
TAX MASTER

Master Software's Tax Master is a functional, menu-driven tool that's designed to both store data from many different returns on the same disk and create multiple schedules for taxpayers with one or more businesses.

The program lists forms and schedules in an order that makes completing a return easy, starting with a depreciation form that contains information needed for the business income or loss schedule. However, the forms and schedules can also be completed in any order you desire. For example, if the only information you have at the time is your wages and mortgage interest paid, you can skip to the last selection, Form 1040 and Schedules A and B, and enter that information. The tax is instantly calculated, and the results can be viewed on the screen or printed on blank paper.

The remaining optional forms and schedules are Schedule D, Capital Gain/Loss; Schedule C, Business Income/Loss; and Schedule F, Farm Income/Loss. Each of these schedules has its own main menu with options to enter data from the keyboard, enter data from another disk, store the data, make corrections, print the data and display the data. Since this menu is included for each schedule and form, it's easy to complete all 1040s for your family or your clients and print them without changing disks or programs.

Unfortunately, Tax Master does not print directly on IRS forms and lacks some of the most important forms—such as 2106, 2441, and 3903—needed by the professional tax preparer. I also wouldn't recommend it for preparing your own taxes for the first time, since there's little tax help. However, for the budget-minded person with experience doing taxes or a professional preparer who just wants to double-check the major schedules, Tax Master is a bargain.


TAX MASTER
THE FOLLOWING FORMS AND SCHEDULES CAN BE CALCULATED BY TAX MASTER. THEY ARE LISTED IN THE ORDER THAT USUALLY PERMITS THE EASIEST COMPUTATION OF YOUR TAXES.
PRESS THE NUMBER KEY THAT IS SHOWN NEXT TO THE FORM YOU WANT TO WORK ON.
1 FORM 4562-DEPRECIATION
2 SCHEDULE D-CAPITAL GAIN/LOSS
3 SCHEDULE C-BUSINESS INCOME/LOSS
4 SCHEDULE E-RENTS AND ROYALTIES
5 SCHEDULE F-FARM INCOME/LOSS
6 FORM 1040 PLUS SCHEDULES A AND B
7 CHECK AND/OR CHANGE DISK DRIVE INFO
8 END PROGRAM AND RETURN TO BASIC

Tax Master forms and schedules.

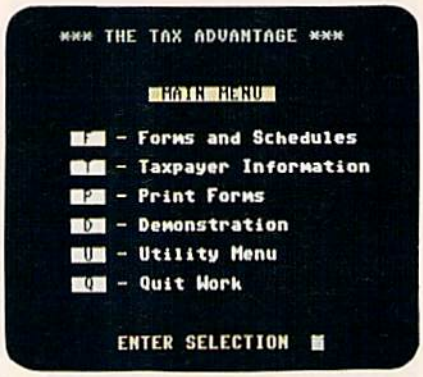
THE TAX ADVANTAGE

The Tax Advantage, from Double Eagle Software, is a complete and easy-to-use program with a main menu that contains six options: Forms and Schedules, Taxpayer Information, Print Forms, Demonstration, Utility Menu and Quit. The Demonstration option, which is highly recommended in the user's manual, is indeed surprisingly informative. Most users familiar with taxes could toss the manual away after sitting through this demonstration.

Following the demo, the program forces you into the Utility option to configure your hardware and initialize a data disk. When you're done initializing the data disk, the program takes you directly to the Taxpayer Information section to enter personal information and your filing status and exemptions.

The Forms and Schedules options include Forms 1040, 2106, 2441 and 6251, and Schedules A, B, C, D, E, F and SE. The entry screen for these forms and schedules is unique to this program. You can jump to any line on a form or schedule with the Line option, and use the function keys to move forward or reverse a screen or line. Also, you can itemize any line. For instance, rather than entering a total for Other Taxes, you can choose to itemize the line and enter the descriptions and amounts. Then the program totals the items and enters the total on the original line. If you want to add only amounts on a line, without descriptions, just enter the dollar amount and press the plus key. At any time, you can select the Help function for tax tips, such as including personal property taxes on the Other Taxes line.

The program automatically recalculates totals, and the tax can be computed anywhere on Form 1040. The new tax,



Tax Advantage 64 main menu.

the overpayment and your tax bracket are displayed at the bottom of the screen.

The Print option lets you print all the forms continuously or any form individually, and, within each form, you can print on plain paper or IRS forms. You can also print any item or line of items on a form and change the printer setup without returning to the Utility option.

The Tax Advantage offers two tax planning features. By pressing the control and X keys simultaneously, you can override the amount entered on a line with an estimate for next year, and selecting the Option function you can activate an override to quickly determine the tax consequences of a year-end tax decision.

Most features are identical between the C-128 and C-64 versions of the program, and the data disk is interchangeable between them. The user's manual is complete and includes a reference guide and printer code appendix.

The only problem I found with this program is the long loading time for each form and schedule and the need to swap between data and program disks. All in all, The Tax Advantage is ideal if you want a complete and efficient program. It may require a little more time for entering information than other programs, but its options ►

*** THE TAX ADVANTAGE ***
A 'function menu' at the bottom of the screen reminds you how to move about the form or make an entry.
You select one of the functions by pressing the key shown in the menu.
Watch while the functions are used to enter data on Form 1040 and Schedule A.
Press RETURN

Tax Advantage 128 screen display.

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and features can be worth it, especially if you need forms not included in other tax packages.

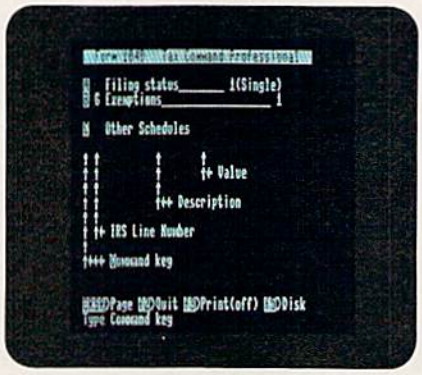
TAX COMMAND PROFESSIONAL

Practical Programs offers two tax programs: Tax Command Professional and Tax Command Planner. Their tax-preparation program, Tax Command Professional, contains more forms and schedules than the other programs I've reviewed here. In fact, it's generally a more professional program, combining completeness and speed.

It'll probably take you a few minutes to figure out how to enter information at the opening screen. Your options are to enter your filing status, your exemptions, or other schedule and IRS line-number information. It's also possible to save to the disk, print or quit from this screen.

By pressing the cursor-down key at the opening screen, you can display each line of Form 1040. Then you can select any line, and place information directly into lines that collect information from another schedule or form or switch to the appropriate form or schedule. While you're entering information, the built-in calculator will simplify totaling items.

The program switches quickly between forms and schedules without going back to the disk drive, doesn't force you to save data and makes subtotal and tax calculations automatically.



Tax Command Professional screen display.

Tax Command Planner screen display.

The Print function works with both blank paper and IRS forms, and it will produce more than one schedule at a time.

The Tax Command Professional manual is basically a reference guide, with very little tax help. It does provide a relatively simple example to follow, but if this is your first time doing your own taxes, I'd recommend buying a tax guide for assistance.

This program is suited to the professional preparer for completing most returns and quickly checking previously prepared returns. It can't print multiples of Schedule C or SE, or Form 2106, but makes up for that in speed.

Practical Programs' Tax Command Planner, while not a tax-preparation program, can be useful for computing various types of depreciation and comparing income and deductions at different tax rates. It can also calculate the present value of future taxes, predict taxes based on a percentage of increased income and figure your marginal tax rate. I would recommend this program if you just want to see an estimate of your refund before turning your records over to your preparer. Tax Command Planner can be used from year to year, as long as you get the updates from Practical Programs. ■

Editor's note: Another Commodore-compatible tax program we've heard about but have not yet seen is Taxaid, from Taxaid Software, 606 Second Ave., Two Harbors, MN 55616. Available in 64 and 128 versions. The price is $49.95, with yearly updates for $18.

Sandra Cook Jerome is a Certified Public Accountant, small-business computer consultant and book and magazine author on business computer topics.

Table 1. Features of Commodore-compatible tax programs.

Feature	Swiftax	Tax Command	Tax Master	Tax Advantage
Price	$49.95	$49.95	$32	$49.95
Form 1040	x	x	x	x
Forms 1040A, 1040EZ	x			
Schedules:				
A	x	x	x	x
B	x	x	x	x
C	x	x	x	x
D	x	x	x	x
E		x	x	x
F	x		x	x
R		x		
SE	x	x		x
2106	x	x		x
2119		x		
4562			x	x
6251				x
8615	x	x		
2441	x	x		x
3903		x		
Prints on IRS forms	x	x		x
128 mode		x		x
1989 update	half-price	half-price	discount	discount

Table 2. Manufacturers' addresses.

Swiftax
Timeworks, Inc.
444 Lake Cook Rd.
Deerfield, IL 60015

Tax Command Professional
Tax Command Planner
Practical Programs, Inc.
PO Box 93104
Milwaukee, WI 53203

Tax Master
Master Software
6 Hillery Court
Randallstown, MD 21133

The Tax Advantage
Double Eagle Software, Inc.
2210 Wilshire Blvd.
Suite 875
Santa Monica, CA 90403

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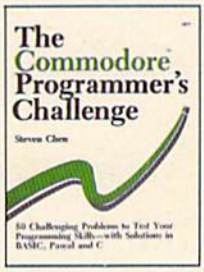

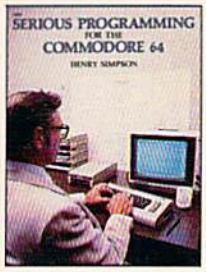

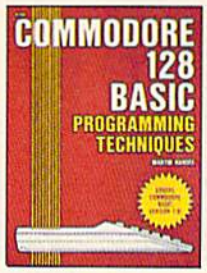

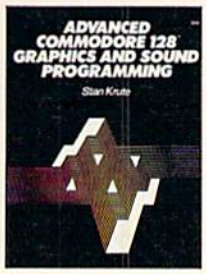

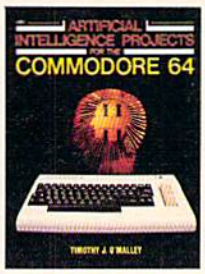

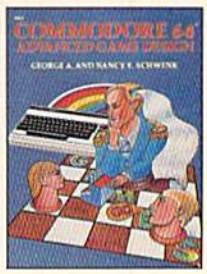

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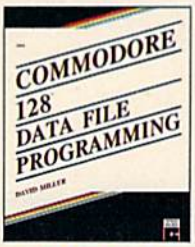

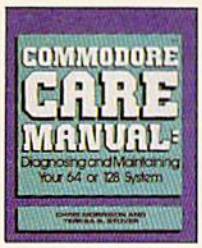

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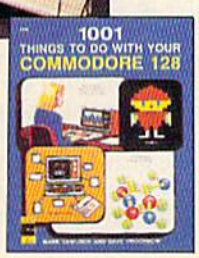

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Kalah

Are your wits sharp enough to win at this centuries-old board game?

By MICHAEL BROUSSARD

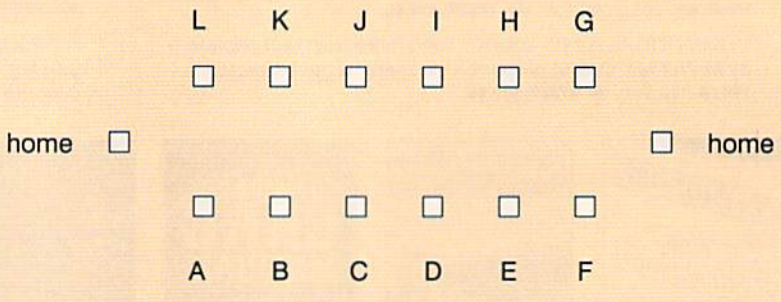
Kalah, written completely in Basic for the C-64 or 128 (in 40-Column mode), is a game of strategy based on a popular African pastime that involves moving counters, usually pebbles, among 14 pits dug in the ground. To play the game, first type in the program in Listing 1, and save it to disk before running it. The computer is your opponent.

When you type RUN, Kalah clears the screen and asks you to declare the skill level you want: Beginner, Intermediate or Expert. To make your choice, type 1, 2 or 3, respectively, and press the return key. Try level 1, Beginner, for your first game. Later, I'll touch on how Kalah varies its strategy according to the skill level chosen.

Next, Kalah prompts you to enter the number of counters (called "stones") that you want in each pit to begin with. Pressing the return key chooses the default number, which is 3. (You may actually specify any number from 1 to 6, but more about this later.) After you make your choice, the screen clears again and shows the game "board," which consists of 14 squares, representing the pits of the original game. (See Figure 1.)

Each pit displays a value that indicates the number of stones it currently contains. If no value is shown, that pit is "empty." The six pits in a row at the bottom of the board—labeled A through F—are under your control. The six above—labeled G through L—are controlled by the computer. The pit at the right end of the two rows is your "home pit"; the one at the far left is the computer's. The object of the game is to accumulate more stones in your home pit than the computer does in its.

Figure 1. How the Kalah game "board" appears on the screen.



How To Play

The computer randomly decides who will play first. In the physical game, you would play by removing all the stones from one of your pits and redistributing them, one at a time, to adjacent pits in a counter-clockwise fashion, skipping no pits *except* the home pit of your opponent. In the computer game, the principle is the same, but the machine does the moving for you.

To choose a pit to play from when it is your turn, simply type the letter (A through F) of the one you want and press return. (Use the delete key if you change your mind or make a mistake.) When you make your selection and press return, the numbers in the squares on the screen change to reflect the new situation. The computer's play is similar, except it chooses from pits G through L and skips *your* home pit.

For example, if your move selection is A, the three stones are removed from that pit and deposited in pits B, C and D. When you've completed the move, pit A is empty and pits B, C and D each contain 4 stones. This ends your turn. If your first move is from pit E, the three stones end up in pit F, your home pit and the computer's pit G. As another example, if a play is from pit E, and it already contains ten stones, the ten would be "sown" into pits F, your home pit, pits G through L, and pits A and B.

Note, again, that you sow a stone into your home pit when you pass it, but you skip the opponent's home pit. Moreover, stones may not be played *from* a home pit. Once a stone is "home," it stays there for the rest of the game.

Two further rules underlie much of the strategy involved in the game. One is that if you make a play that ends with the last stone deposited into your home pit, you immediately get another turn. Through careful playing, you can sometimes get several turns in a row.

The other rule is that if the last stone you play ends up in an empty pit that belongs to you, any stones in the computer's pit that's directly opposite are "captured" and placed immediately in your home pit, thus swelling your score. For example, suppose your pit C is empty and pit A contains two stones. If you play from pit A, the first stone ends up in pit B and the last one in C, which was empty. You then capture any stones that may be in the computer's pit J, which is directly opposite C. You place the stones from pit J (if any) in your home pit, and your turn ends.

Play continues until one player has no more stones in any of the six pits on his side of the board. The game is then over, and any stones remaining on the opponent's side are moved to his home ►

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pit and count toward his score. (For this reason, it's not always wise to "go out" too early!) Whoever then has the most stones in his home pit is the winner of the game.

Further Wrinkles

As the computer ponders its next move, it displays "Thinking. . ." on the screen, so that you know it is doing something. As a play is made by either player, the values in the affected pits turn red momentarily so that you can better see the effect of the move.

The computer pauses briefly before continuing or prompting for your next move. If you prefer not to wait, you can end the pause by pressing the space bar. Alternatively, you can adjust the length of the pause by changing the value assigned to the variable T1 on line 100 of the program. Decreasing that value shortens the pause between moves, and vice versa.

A word about the skill levels from which you choose at the beginning of the game: At the Beginner level, the computer takes any free moves it can find and then moves at random. At Intermediate level, the game also adds capture and capture-avoidance features to its strategy. And in Expert mode, the computer tries to determine which play leaves it in the best position with respect both to extra plays and to captures on its next move.

Your choice, also at the start of the game, of the number of stones per pit will somewhat determine the quality of the game. The default is 3, but you may select any number from 1 to 6. Choosing a greater number increases the length and complexity of the game.

The rules of Kalah are easy to learn, but you soon find that the more you play, the more strategy you discover. Try it and find out for yourself why this game's popularity has endured for hundreds of years. R

Michael Broussard is a systems engineer for Stratus Computer. He has written many articles for RUN, *the first as long ago as April 1984.*

Listing 1. The Kalah game program.

```
1 REM KALAH - M. BROUSSARD
                          :REM*46
100 T1=0 : REM DELAY BETWEEN TU
    RNS                   :REM*178
110 DEF FNB(X)=X+14*(X>14)-1*(X
    >20)+14*(X>27)-1*(X>33)+14*
    (X>40)-1*(X>46)       :REM*92
120 POKE53280,3:POKE53281,1:PRI
    NT"{CTRL 1}{SHFT CLR}{CRSR
    DN}"TAB(18)"{CTRL 9}KALAH{2
     CRSR DNs}"           :REM*124
130 R$="{HOME}":FORK=1TO80:C$=C
    $+"{CRSR RT}":R$=R$+"{CRSR
    DN}":NEXT             :REM*22
140 DIMR(14),C(14),A(14),S(14),
    T(14):FORK=1TO14:READR(K),C
    (K):NEXT              :REM*253
150 PRINT"PLEASE CHOOSE SKILL L
    EVEL:{CRSR DN}":PRINTTAB(5)
    "1) BEGINNER"         :REM*195
160 PRINTTAB(5)"2) INTERMEDIATE
    ":PRINTTAB(5)"3) EXPERT"
                          :REM*230
170 PRINT"{CRSR DN}"TAB(5):INPU
    T"(1, 2, OR 3){2 SPACEs}2{3
     CRSR LFs}";N$:LV=VAL(N$):I
    F LV<1ORLV>3THEN150 :REM*40
180 N$="":INPUT"{CRSR DN}HOW MA
    NY STONES PER PIT{2 SPACEs}
    3{3 CRSR LFs}";N$:N=VAL(N$)
                          :REM*84
190 IFN<1ORN>6THENPRINT"PLEASE
    CHOOSE A VALUE BETWEEN 1 AN
    D 6":GOTO180          :REM*219
200 X$="{5 SPACEs}":PRINT"{SHFT
     CLR}{CRSR DN}"TAB(18)"{CTR
    L 9}KALAH{2 CRSR DNs}":F=1
                          :REM*33
210 PRINTX$"{2 SPACEs}L{4 SPACE
    s}K{4 SPACEs}J{4 SPACEs}I{4
     SPACEs}H{4 SPACEs}G"
                          :REM*139
220 PRINTX$"{SHFT U}{3 SHFT *s}
    {SHFT I}{SHFT U}{3 SHFT *s}
    {SHFT I}{SHFT U}{3 SHFT *s}
    {SHFT I}{SHFT U}{3 SHFT *s}
    {SHFT I}{SHFT U}{3 SHFT *s}
    {SHFT I}{SHFT U}{3 SHFT *s}
    {SHFT I}              :REM*57
230 PRINTX$"{SHFT -}{3 SPACEs}{
    2 SHFT -s}{3 SPACEs}{2 SHFT
     -s}{3 SPACEs}{2 SHFT -s}{3
     SPACEs}{2 SHFT -s}{3 SPACE
    s}{2 SHFT -s}{3 SPACEs}{SHF
    T -}                  :REM*252
240 PRINTX$"{SHFT J}{3 SHFT *s}
    {SHFT K}{SHFT J}{3 SHFT *s}
    {SHFT K}{SHFT J}{3 SHFT *s}
    {SHFT K}{SHFT J}{3 SHFT *s}
    {SHFT K}{SHFT J}{3 SHFT *s}
    {SHFT K}{SHFT J}{3 SHFT *s}
    {SHFT K}              :REM*81
250 PRINT"{2 SPACEs}{SHFT U}{3
    SHFT *s}{SHFT I}{26 SPACEs}
    {SHFT U}{3 SHFT *s}{SHFT I}
                          :REM*84
260 PRINT"{2 SPACEs}{SHFT -}{3
    SPACEs}{SHFT -}{26 SPACEs}{
    SHFT -}{3 SPACEs}{SHFT -}
                          :REM*217
270 PRINT"{2 SPACEs}{SHFT J}{3
    SHFT *s}{SHFT K}{26 SPACEs}
    {SHFT J}{3 SHFT *s}{SHFT K}
                          :REM*152
280 PRINTX$"{SHFT U}{3 SHFT *s}
    {SHFT I}{SHFT U}{3 SHFT *s}
    {SHFT I}{SHFT U}{3 SHFT *s}
    {SHFT I}{SHFT U}{3 SHFT *s}
    {SHFT I}{SHFT U}{3 SHFT *s}
    {SHFT I}{SHFT U}{3 SHFT *s}
    {SHFT I}              :REM*252
290 PRINTX$"{SHFT -}{3 SPACEs}{
    2 SHFT -s}{3 SPACEs}{2 SHFT
     -s}{3 SPACEs}{2 SHFT -s}{3
     SPACEs}{2 SHFT -s}{3 SPACE
    s}{2 SHFT -s}{3 SPACEs}{SHF
    T -}                  :REM*184
300 PRINTX$"{SHFT J}{3 SHFT *s}
    {SHFT K}{SHFT J}{3 SHFT *s}
    {SHFT K}{SHFT J}{3 SHFT *s}
    {SHFT K}{SHFT J}{3 SHFT *s}
    {SHFT K}{SHFT J}{3 SHFT *s}
    {SHFT K}{SHFT J}{3 SHFT *s}
    {SHFT K}              :REM*13
310 PRINTX$"{2 SPACEs}A{4 SPACE
    s}B{4 SPACEs}C{4 SPACEs}D{4
     SPACEs}E{4 SPACEs}F"
                          :REM*127
320 FORK=1TO14:A(K)=N:NEXT:A(7)
    =0:A(14)=0:K=1:GOSUB730
                          :REM*115
330 X$="YOU":F=1:IF RND(0)<.5 T
    HEN X$="I":F=2        :REM*79
340 PRINTMID$(R$,1,19)TAB(12)X$
    "{SHFT SPACE}WILL GO FIRST.
    ";:FORK=1TO1600:NEXTK
                          :REM*82
350 PRINTMID$(R$,1,19)TAB(12)"{
    18 SPACEs}";:IF F=2 THEN 44
    0                     :REM*196
360 PRINTMID$(R$,1,19)TAB(14)"Y
    OUR MOVE?{2 SPACEs}{CRSR LF
    }";:X$=""             :REM*83
370 GETZ$:IFZ$=""THEN370
                          :REM*220
380 IFZ$=CHR$(20) AND X$<>"" TH
    EN PRINT"{CRSR LF} {CRSR LF
    }";:X$="":GOTO370     :REM*45
390 IF Z$=CHR$(13) AND X$<>"" T
    HEN 420               :REM*218
400 IF Z$>="A" AND Z$<="F" AND
    X$="" THEN X$=Z$: PRINTX$;
    : GOTO 370            :REM*220
410 GOTO 370              :REM*237
420 K=ASC(X$)-64:GOSUB470
                          :REM*238
430 ON F GOTO 360,440     :REM*229
440 PRINTMID$(R$,1,22)TAB(14)"{
    CTRL 9}THINKING....{CTRL 0}
    ";:GOSUB790:K=P       :REM*99
450 PRINTMID$(R$,1,22)TAB(14)"{
    12 SPACEs}";          :REM*210
460 PRINTMID$(R$,1,19)TAB(14)"M
    Y MOVE IS "CHR$(K+63):GOSUB
    470:X=1:GOTO430       :REM*110
470 J=A(K):IFJ=0THENON F GOTO 3
    60,1160               :REM*113
480 A(K)=0:I=K            :REM*139
490 X$=STR$(A(I)):IF A(I)=0 THE
    N X$="{2 SPACEs}"     :REM*127
500 PRINT"{CTRL 3}":PRINTMID$(R
    $,1,R(I))MID$(C$,1,C(I))X$M
    ID$(" ",1,-(A(I)<10))"{CTRL
     7}";                 :REM*182
```

```
51Ø FORZ=1TO4Ø:NEXTZ:IF J=ØTHEN
    55Ø                    :REM*122
52Ø I=I+1:IF(I=14ANDF=1)OR(I=7A
    NDF=2)THENI=I+1        :REM*53
53Ø IF I>14 THEN I=1       :REM*4Ø
54Ø A(I)=A(I)+1:J=J-1:GOTO49Ø
                           :REM*1
55Ø X=-I+14:IF F=1ANDA(I)=1ANDI
    <7THEN A(7)=A(7)+A(X):A(X)=
    Ø:GOTO57Ø              :REM*58
56Ø X=-(I-14):IF F=2 AND A(I)=1
     ANDI>8 THEN A(14)=A(14)+A(
    X):A(X)=Ø              :REM*88
57Ø IF (I=7ANDF=1)OR(I=14ANDF=2
    )THEN59Ø               :REM*168
58Ø F=2+(F=2)              :REM*1Ø2
59Ø GETX$:IFX$<>""ORX>T1 THEN 6
    1Ø                     :REM*18Ø
6ØØ X=X+1:GOTO59Ø          :REM*78
61Ø GOSUB73Ø               :REM*178
62Ø IF A(1)+A(2)+A(3)+A(4)+A(5)
    +A(6)=Ø THEN 64Ø       :REM*33
63Ø IF A(8)+A(9)+A(1Ø)+A(11)+A(
    12)+A(13)<>Ø THEN RETURN
                           :REM*13Ø
64Ø PRINTMID$(R$,1,21)TAB(15)"G
    AME OVER"              :REM*1Ø
65Ø FORJ=1TO8STEP7:FORL=JTOJ+5:
    IFA(L)THENA(J+6)=A(J+6)+A(L
    ):A(L)=Ø:GOSUB73Ø      :REM*149
66Ø NEXTL:NEXTJ            :REM*2Ø9
67Ø X=A(7):Y=A(14):X$=MID$("TIE
     GAMEYOU WIN! I WIN! ",1+-(
    (X>Y)+(X<Y)*2)*8,8)    :REM*7
68Ø PRINTMID$(R$,1,22)TAB(16)X$
                           :REM*198
69Ø PRINT"{CRSR DN}WOULD YOU LI
    KE TO PLAY AGAIN (Y/N)? ";
                           :REM*186
7ØØ GET X$:IF X$<>"Y" AND X$<>"
    N"THEN7ØØ              :REM*237
71Ø PRINT X$;:IF X$="N"THENEND
                           :REM*127
72Ø RUN                    :REM*89
73Ø K2=K:PRINT"{CTRL 7}"
                           :REM*149
74Ø X=A(K):PRINTMID$(R$,1,R(K))
    ;                      :REM*1Ø8
75Ø X$=STR$(X):IF X=Ø THEN X$="
    {2 SPACEs}"            :REM*129
76Ø PRINTMID$(C$,1,C(K))X$MID$(
    " ",1,-(X<1Ø));:K=K+1:IFK>1
    4THENK=1               :REM*112
77Ø IF K=K2 THEN PRINT"{CTRL 1}
    ":RETURN               :REM*51
78Ø GOTO 74Ø               :REM*9Ø
79Ø FORK2=1TO14:T(K2)=A(K2):NEX
    TK2:P=Ø                :REM*91
8ØØ X1=Ø:X2=Ø:FORK=13TO8STEP-1:
    X=FNB(A(K)+K)          :REM*48
81Ø IFA(K)=13OR(X>7)AND(A(X)=Ø)
    THENIFA(14-X)>X2THENX1=K:X2
    =A(14-X)               :REM*92
82Ø NEXTK                  :REM*72
83Ø FORK=13TO8STEP-1:IFA(K)=-K+
    14THENIF(K>X1)AND(P=Ø)THENP
    =K                     :REM*168
84Ø NEXT K                 :REM*1ØØ
85Ø IF P THEN RETURN       :REM*162
86Ø FORJ=1TO14:S(J)=Ø:NEXT:IF L
    V=1THEN11ØØ            :REM*186
87Ø FORJ=8TO13:X=FNB(A(J)+J):IF
    X>7THENIF(A(X)=Ø)ANDA(J)THE
    NS(J)=S(J)+1Ø*A(14-X)
                           :REM*45
88Ø X=A(14-J):IFX<>ØORJ=13THEN9
    2Ø                     :REM*178
89Ø FORK=1TO14-J-1:IFA(K)+K=14-
    JTHENS(J)=S(J)+1Ø*A(J)
                           :REM*2Ø
9ØØ IF A(K)=13THENS(J)=S(J)+1Ø*
    A(14-K)                :REM*149
91Ø NEXTK                  :REM*162
92Ø NEXTJ:IF LV=2 THEN 11ØØ
                           :REM*42
93Ø FORJ=8TO13:FORK=1TO14:T(K)=
    A(K):NEXTK             :REM*153
94Ø IFT(J)=ØTHEN99Ø        :REM*83
95Ø M=T(J):N=J:T(J)=Ø      :REM*227
96Ø N=N+1:IFN>14THENN=1    :REM*98
97Ø IFN=7THENN=8           :REM*139
98Ø T(N)=T(N)+1:M=M-1:IF M THEN
    96Ø                    :REM*49
99Ø FORK=13TO8STEP-1       :REM*12Ø
1ØØØ IFT(K)=14-KTHENS(J)=S(J)+1
                           :REM*32
1Ø1Ø NEXTK                 :REM*15
1Ø2Ø FOR K=8 TO 13         :REM*197
1Ø3Ø X=FNB(T(K)+K):IFX>7THENIF(
    T(X)=Ø)ANDT(K)THENS(J)=S(J
    )+2*T(14-X)            :REM*184
1Ø4Ø IF T(K)=13THENS(J)=S(J)+2*
    T(14-K)                :REM*127
1Ø5Ø X=T(14-K):IF X<>ØTHEN1Ø9Ø
                           :REM*94
1Ø6Ø FOR L=1TO14-K-1:IF T(L)>ØA
    NDT(L)+L=14-KTHENS(J)=S(J)
    -1Ø*T(K)               :REM*185
1Ø7Ø IF A(L)=13THENS(L)=S(L)+1Ø
    *A(14-L)               :REM*146
1Ø8Ø NEXT L                :REM*87
1Ø9Ø NEXT K:NEXT J         :REM*139
11ØØ X=-999:FORK=8TO13:IFS(K)>=
    XTHENIFS(K)=XANDRND(-1)>.5
    THEN113Ø               :REM*222
111Ø IF S(K)<X THEN 113Ø
                           :REM*197
112Ø X=S(K):P=K            :REM*127
113Ø NEXTK: IF X=-999 THEN RETU
    RN                     :REM*227
114Ø IFA(P)=ØTHENS(P)=-999:GOTO
    11ØØ                   :REM*117
115Ø RETURN                :REM*9
116Ø PRINT"LOGIC ERROR!!":END
                           :REM*3Ø
117Ø DATA 13,6,13,11,13,16,13,2
    1,13,26,13,31,1Ø,34,7,31,7
    ,26,7,21,7,16,7,11:REM*22Ø
118Ø DATA 7,6,1Ø,3         :REM*1Ø7
```

■

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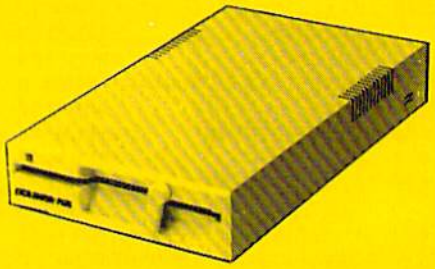

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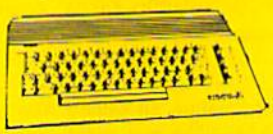

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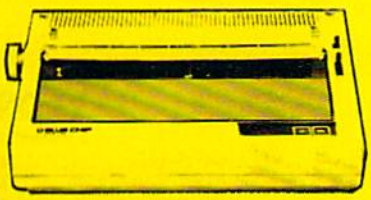

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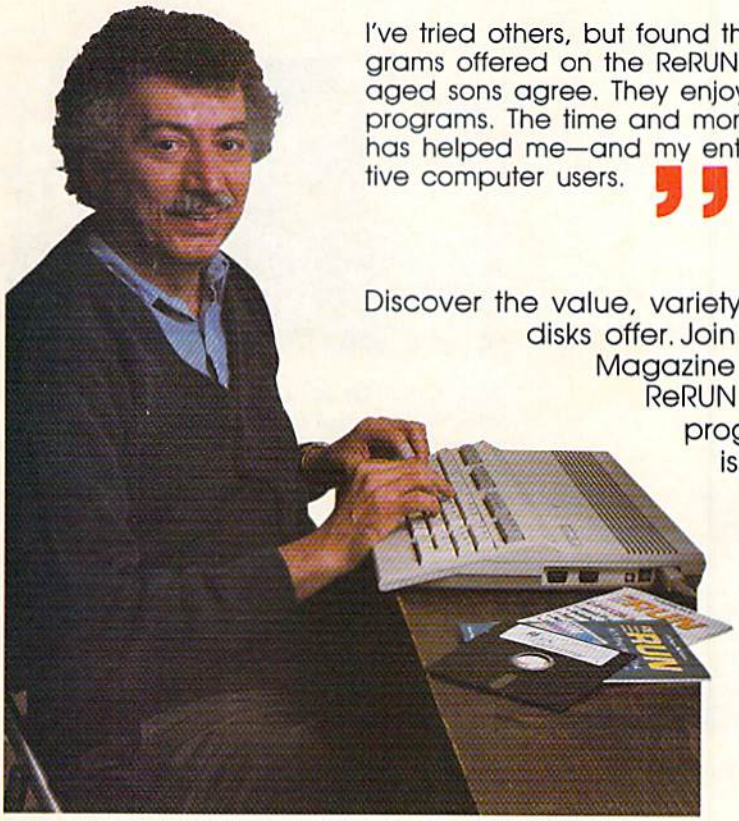

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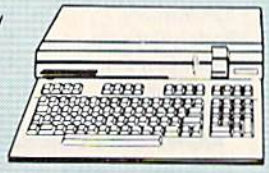

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SL 80Ai	$329.95	SPB 10	$CALL
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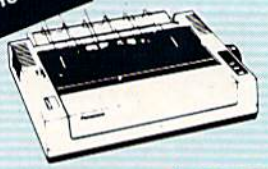

$179.95

KX-P1180

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Courier 2400 PS	$259.95
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GAMES GALLERY

Get the lead out, soldier, and take aim at the land combat adventures you'll meet in Steel Thunder and Heavy Metal.

By BOB GUERRA

SEVERAL NEW SIMULATIONS are released each year for the C-64 that let you defend the computerized skies in a modern fighter plane. Currently, computer warriors have a wide variety of aircraft to choose from, including the F-14 Tomcat, F-15 Eagle,F-18 Hornet and F-19 "Stealth" fighter. Even our silicon seas are well-defended, thanks to submarine simulations such as Silent Service, Up Periscope! and Red Storm Rising, as well as games like Destroyer, PHM Pegasus and Ocean Ranger, all of which put you in command of armed surface vessels.

But when it comes to military land vehicles—tanks, armored personnel carriers, mobile air defense/anti-tank systems, fast attack vehicles and the like—war gamers have been left virtually unarmed.

Fortunately, software companies are beginning to fill this gap in the software arsenal. Two of the latest games to take an overland route to the front are Accolade's Steel Thunder and Access Software's Heavy Metal: Modern Land Combat.

STEEL THUNDER

If you've ever had the urge to take a spin in a modern battle tank like the M1A1 Abrams or M48A5 Patton but weren't quite prepared to spend the next few years in training in West Germany, then Steel Thunder is the next best thing. Besides the Abrams and Patton tanks, Steel Thunder can also put you in the driver's seat of the M3 Bradley or M60A3 tank. But, just because Steel Thunder is from Accolade, don't expect your trip to be a relaxing "test drive" up a long and winding road. Here, you have a lot more to worry about than an occasional speeding ticket from the highway patrol.

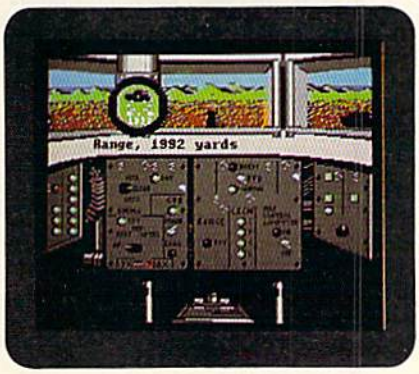
The program offers more than 20 combat missions in three areas of the world. All new recruits begin active duty in Cuba but, if you've really got what it takes to be a first-rate tank commander, you may eventually transfer to Syria or—if you're feeling brave—the most hazardous tour of duty, West Germany.

Dig the specs of the M3 Bradley tank in Steel Thunder.

Along the way you can advance from private to the rank of general by successfully completing a variety of dangerous combat missions, ranging from destroying an enemy mortar post in Cuba to wiping out the enemy's entire stock of nuclear, biological and chemical weapons spread out among five West German bunkers.

What gives Steel Thunder its realistic feel, however, isn't the types of missions—it's the appearance of the tank's interior and the three-periscope view as you roll over the hillsides.

Before designing the tanks' interiors, programmer Tom Loughry actually climbed inside an M1 and took some pictures. "I wanted to see what it really feels like to be inside the tank so that I could duplicate that in the game." In addition, Loughry talked with the soldiers who use the tanks to find out about the capabilities, advantages and disadvantages of the vehicles.



The graphics of the interior of the tanks in Steel Thunder are modeled after the real thing.

In talking with Loughry, I also discovered the reason I was having such a tough time getting through one of the Syrian missions. In the mission, you are instructed by the general to go behind enemy lines and destroy an oil depot. The general suggests taking a Bradley, but Loughry had other advice: "Don't always trust the general. I mean, he does his best but you're supposed to become good enough and be able to evaluate the missions enough to pick your own tank. He suggests something that will work, but I think I'd take an M1. Your chances of survival are better."

HEAVY METAL

Back in 1983, Access Software released its first C-64 program, Beach Head. Designed by Bruce Carver, Beach Head is a multi-screen action game with realistic sound effects and dazzling graphic animation of incoming fighters and outgoing anti-aircraft shells.

In many ways, the company's latest offering, Heavy Metal, is similar to its original product. For Heavy Metal, Brent Erickson and brothers Bruce and Roger Carver teamed up to create a war game with plenty of action and some strategy elements. The action comes from three combat simulations that can be played individually or as part of the larger, tactical game.

One combat simulation lets you take the controls of an M1A1 Abrams main battle tank (MBT). Like the old arcade game Battlezone, the MBT sequence simply requires you to cruise around the battlefield with your 120 mm cannon blasting anything that moves. Though not equipped like the Steel Thunder Abrams, this tank does come with a thermal imaging system, laser range-finder, three types of shells and a smoke generator.

The second type of vehicle you can command is an air defense anti-tank

system, ADAT, for short. The ADAT can fire both missiles and 30 mm shells from its turret-based launch platform. While the joystick button is used to fire your cannon at approaching MIGs or passing T-80 tanks, missiles are aimed automatically and are launched by simultaneously pressing the firebutton on a second joystick (your big toe is great for this), by yelling "Fire!" (or some other word that isn't likely to cause the inadvertent evacuation of your apartment building) into an Access LipStik or by pressing the space bar on your 64. Surprisingly, according to both Roger Carver and Brent Erickson, the method of choice around the Access camp is the space bar.

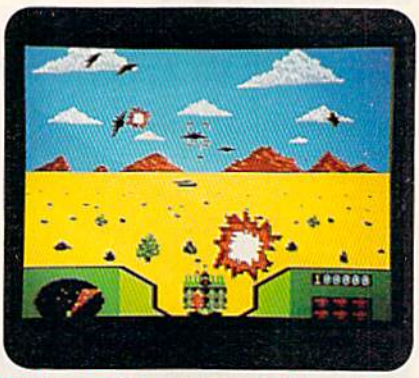
The third combat sequence, the fast attack vehicle (FAV), is like a dune buggy with a TOW missile launcher attached. Your object here is to drive through many defense levels while destroying or avoiding incoming artillery shells, enemy tanks and helicopters, and wending your way around various types of rubble strewn about the battlefield.

In the tactical game, your goal is to defend your Tactical Command Center (TACC) against enemy forces by using all three types of units mentioned above, along with a fourth unit of your choice. At the start of a game, you're shown a map of the area surrounding your TACC. The positions of the attacking enemy units, as well as your own four units, are displayed along with statistics describing your units' strength and supply state.

Although you can play the entire game from the map by instructing your units to move, engage the enemy or resupply when necessary, this approach will never result in victory. You enter each conflict outnumbered and, if left to computer control, your existing forces will perform only as well as the enemy, ultimately losing by attrition. What you must do to win is to alternate between tactical command and direct control of one of your units—preferably the one you're most successful with in battle.

Brent Erickson also suggests attacking the enemy as far away from the TACC as possible and cautions that the enemy's main objective is to reach the command center. "If you don't engage the enemy, they'll go right around you and head for your TACC." Erickson further suggests that if the enemy does take control of your headquarters, you can quickly regain control by engaging the enemy unit in combat.

The possibility of a sequel to Heavy Metal is still up in the air. According to Erickson, "we're kind of waiting to see what the response is to [Heavy Metal]; if it's good, then we'll do another one."



Ka-boom! Right on target! But watch out for approaching MIGs in Access Software's Heavy Metal.

So which war game should you buy if a limited defense budget forces you to make a choice? I suggest Steel Thunder because it's by far the more richly detailed and realistic of the two, not only graphically but also in terms of missions, instrumentation and control. However, if you can appropriate additional funds from domestic spending, then Heavy Metal is a good second line of defense. ■

Bob Guerra, editor for a Boston hospital, has successfully fought his way through many war games.

Steel Thunder Strategy Hints

1.—Learn to control sight magnification and slew rate so you can quickly see targets on the horizon and destroy them before they get close enough to destroy you.

2.—Once you spot enemy vehicles, slow down and, as they come into range, pick them off before they start putting holes in you. Also scan the horizon continuously with your three-power scope and learn to pick up enemy vehicles when they're still just dots.

3.—If all else fails, lay smoke. Then, either go slow enough or back up to stay in the smoke. While surrounded by smoke, you can see the enemy by using your thermal gunsight, but they can't see you.

4.—Of the three types of external armor—tank treads, sand bags and blazer reactive—the blazer offers the best protection in all situations.

5.—Use a shell like the APFSDS armor-piercing round to destroy enemy tanks at long range.

6.—Try to control everything from the commander's turret, which provides the greatest viewing range.

Heavy Metal Strategy Hints

1.—During the ADAT sequence, the single MIGs that fly in from the side of the screen are worth more points than those that are in formation. Also, the T-80 tanks are worth twice the points of MIGs.

2.—The FAVs are a good supporting unit to select because they're faster than all other types of units and can head off the attacking enemy sooner.

3.—While at the tactical map, monitor the fuel and ammunition supplies of your units carefully. Remember, once a unit's fuel supply has been depleted, there's just no way to make it back to the TACC to get more.

4.—Keep an eye on the radar display during the ADAT sequence. Sometimes it's easy to forget about a fighter squadron attacking from the side if you rely solely on the view from your turret. R

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If you happen to see the ads on RAMBOard (original name huh), they claim to be cheaper. Well, that's partially true, but as is usual, mostly false. First you need to buy their board, then you need to spend another $34.95 for software to run their board. **That makes the cost of Rambo/Renegade to be at least $69.90. But then they claim you can use our software (what does that say about their software?). Well now, that may be just a bit of a white lie as well, while it's true that early, less reliable versions work with THEIR thing, the new more reliable versions of SuperCard software is specifically designed not to work with their RAMBO. For those people that have found out that the RAMBO and Renegade software package are quite inferior to SuperCard we offer the following suggestion. Send in your RAMBO and $24.95 and WE'LL SEND YOU THE REAL THING — SuperCard.** Needless to say you need a pair of hip boots to walk through their claim that they are the best. By the way, their software that backs up an unprotected disk in 50 seconds, well, it doesn't even use the RAMBO to work. **I suppose if you had a choice of an OLDSMOBILE or a Corvette with no engine, you would still pick the Oldsmobile.**

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MAIL RUN

Readers applaud our disk-based GEOS Power Pak, berate us for publishing so many games and deplore our downgrading of the Lt. Kernal.

FANTASTIC VOYAGE

Please thank author Ellen Rule for the fantastic article in the December 1988 issue of *RUN*, "Journey to the Center of Your Commodore." I did find an error, however. The article is confusing about the location of the PLA and SID chips. The close-up photo on page 82 shows the SID chip directly *east* of the CPU, and the large photo on the same page clearly shows the PLA is *south* of the SID.

—JAMES C. HASKELL
PRESQUE ISLE, ME

You're absolutely right, Jim. Our technical editors used a motherboard from a 64C for illustration, and it's configured a bit differently from the author's C-64.

—EDITORS

DOWN WITH GAMES

Polls do *not* indicate that most *RUN* readers are interested in games. So why allocate so much editorial space to games? Polls *do* indicate a more mature reader, in age, education and income (see "RUNning Ruminations," July 1988). Do what a computer magazine was meant to do: educate, solve readers' problems and review productivity and utility software (games will always sell to kids and technical editors). So please, no more games!

—DANIEL H. TOTH
BATH, SC

I'm 62 years old, I've worked as an electronics engineer for 40-plus years, and I have absolu-u-u-tely no earthly use for all those C-64 games being advertised on far too many *RUN* pages.

—JOHN G. SCHMID
LOMPOC, CA

I'm sick of games! I use three C-64s to take care of my business and home needs. They do everything from word processing to scientific work. But no games! I've looked through your advertisers' ads for the past three months; no spreadsheet programs, no database programs. Just games!

I know many Commodore users who'd like to read more about business applications. I hope you recognize the fact that many of us use the Commodore in everyday life. We need you. We need product support. Not games!

—JOHN W. CORR
MARTINEZ, CA

Anti-gamers are no doubt dismayed to see RUN*'s new column, Games Gallery, devoted to reviews and discussion of games, but we started it in response to all the interest expressed by pro-gamers. C-64 users complain that we devote too much space to the 128, and vice-versa. We try to maintain a balance and print what our readers want and need, but not all readers' wants and needs are alike, so obviously we can't please everybody. Sorry about that.*

—EDITORS

MEASURING UP

Michael Broussard's Measure Mate program ("For Good Measure," *RUN*, November 1988) is wonderful! I was able to consolidate a lifetime collection of weight-and-measure charts and verify most of the values.

Here are some additional conversions your readers might want to include.

```
2065 DATA 1,1,219.456,CABLE LENGTHS :REM*217 (120 fathoms)
2105 DATA 1,4,1.268604,CHALDRONS :REM*103 (36 bushels)
2153 DATA 1,1,20.1168,CHAINS :REM*169 (66 feet; surveyor's
     measure)
2156 DATA 2,3,404.685637,CH2,CHAINS2 :REM*125 (10 square
     chains = 1 acre)
2173 DATA 1,4,3.60556416,CORDS :REM*134 (8 cord feet)
2176 DATA 1,4,.45069552,CORD FEET :REM*30 (16 cubic feet)
2235 DATA 1,4,9.85787297E-6,DESSERTSPOONS :REM*231
2245 DATA 1,4,8.21489415E-8,DROPS :REM*218 (60 drops =
     1 teaspoon)
2415 DATA 1,4,.2384802,HOGSHEADS :REM*116 (63 gallons)
2693 DATA 1,1,10000,MYRIAMETERS :REM*16
2696 DATA 1,1,1853.184,NAUTICAL MILES :REM* (6080 feet)
2855 DATA 1,3,1011.7141,ROODS :REM*130 (4 roods = 1 acre)
2885 DATA 1,4,.99477515,STERE :REM*153
2893 DATA 1,4,1.47868095E-5,TABLESPOONS :REM*149
2896 DATA 1,4,4.92893648E-6,TEASPOONS :REM*14
```

Also, my source has different values for rods, so you may want to make these changes:

```
2840 DATA 1,1,5.0292,RODS :REM*
2850 DATA 1,3,25.292853,RODS2 :REM*119
```

—MARJI UMBRICHT
HOUSTON, TX

We've devoted $4^{9}/_{16}$ column inches, or $27^{1}/_{2}$ picas, of space to your additions and corrections. Thanks bushels, Marji.

—EDITORS

HOW DARE YOU!

I was extremely disappointed in your review of the Lt. Kernal. It lacked an overall sense of the product, and several features were mentioned only briefly or completely omitted. In my opinion, the Lt. Kernal is the best hard drive available for the Commodore computer.

I admit that no hardware is perfect, but the Lt. Kernal deserves a better grade. I've had little trouble with the drive. ►

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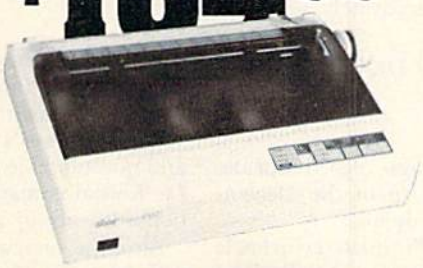

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Circle 155 on Reader Service card.

The manual is helpful, though some commands could be explained more fully.

The reviewer mentioned he had trouble using the Basic Load"$" command. Read the manual! To get the directory, just type in DIR.

In closing, I think the review should be repeated. And, this time, treat the Lt. Kernal fairly and accurately, or please do not review it at all.

—James Dean Wallace
Canon, GA

I've long held the reviews in *RUN* in high regard, but the review of the Lt. Kernal hard disk drive in the December 1988 Hardware Gallery is not one of them.

The reviewer claims you must connect "insulated clip leads to a few small chips." The fact is, you connect one clip lead to one chip in the C-128 version, and one clip lead to one chip and one clip lead to one resistor in the C-64 version. This is hardly the effort implied by your reviewer.

He also lambastes as "quirksome" an operating system that allows one to load any file merely by typing l filename and have it load into its proper load address. Quirksome? Hardly. The Lt. Kernal operating system is so user friendly that even my wife can use it, and she's a total computer illiterate!

The reviewer could benefit from the Validate and Recover commands, if he has the 7.1 DOS. I doubt he took the trouble to look at these commands, since he seems to know nothing about them and laments the "loss" of his system index, which these commands would rebuild for him.

Saying the Lt. Kernal's operating system is "intimidating and quirksome" only proves his total lack of familiarity with the equipment.

—Fred S. Dart
Salem, UT

I've come to rely on *RUN*'s accurate software and hardware reviews to assist me in making purchasing decisions. But this time the Lt. Kernal review fails to meet this standard.

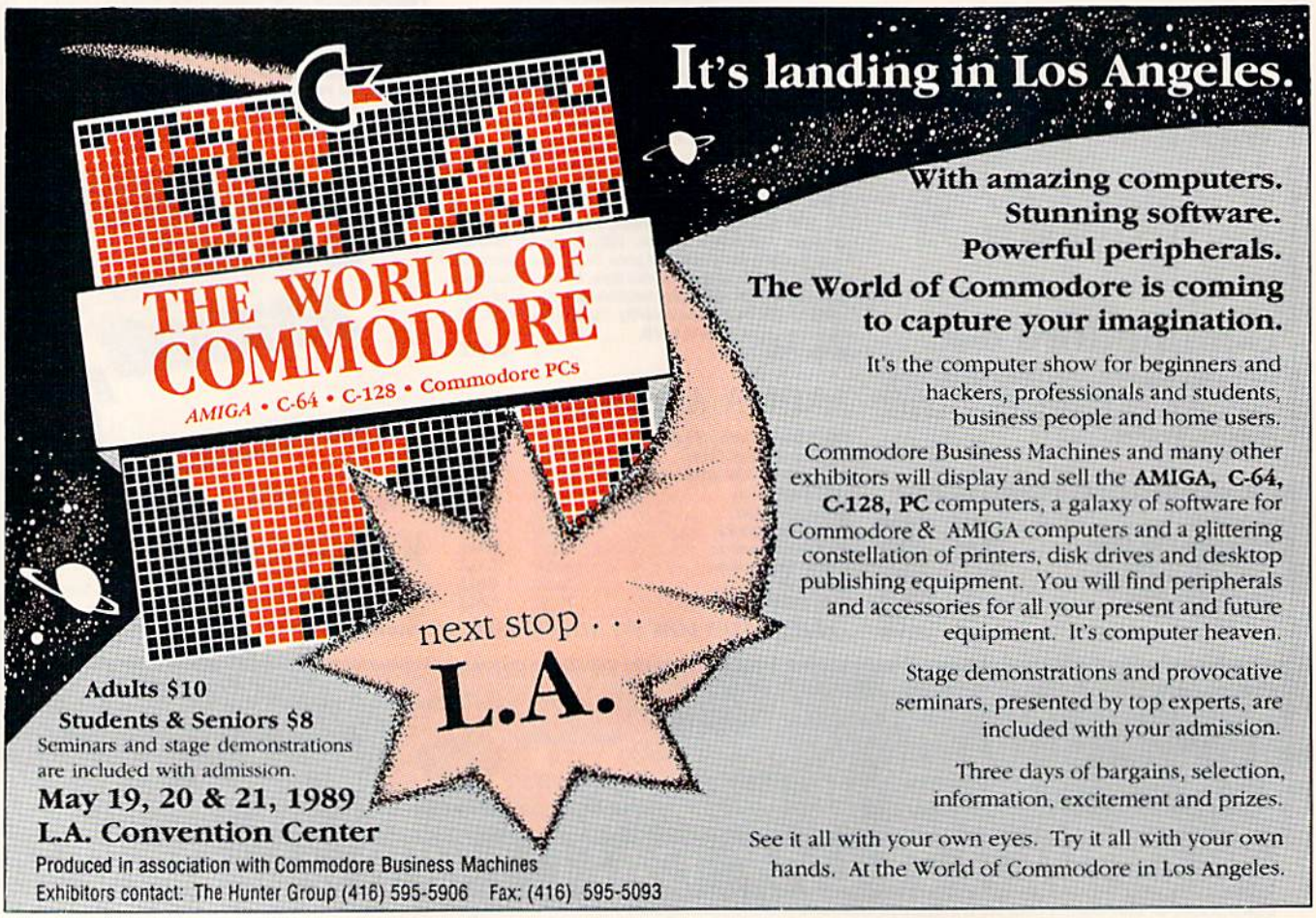
The reviewer's article is rife with technical inaccuracies and questionable comments. For example, he states that the Lt. Kernal contains ". . . the circuit board from a conventional PC power supply. . .", which it does not.

Also, the reviewer was taken aback by the ". . . status line with a lot of unfamiliar information." The manual supplied with the drive, which he apparently skimmed over, explains the "unfamiliar information."

The comments about transferring files from floppy disk to the Lt. Kernal further support my contention that he skimmed the documentation. The DOS includes several utilities for performing such operations, all of which are discussed in the manual.

There are many other inaccuracies and questionable comments that would make my letter too long to publish, but I think you get my drift.

—William J. Brier
Bensenville, IL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MAIL RUN

Like all reviews, our review of the Lt. Kernal was one person's (John Premack, who has extensive experience as a Commodore user and SYSOP for the Boston Computer Society) experience and opinion about using the product. We've read other reviews of this hard drive, some of which are equally critical of the product for its lack of documentation in some areas, its expense, and its being difficult or inappropriate or unsuitable for the average Commodore home computer user. However, we are pleased to hear that you and many others enjoy using this system and have experienced no difficulties.

—EDITORS

MUCH ADO ABOUT NOTHING

I enjoyed your article on the pros and cons of Quantum-Link (Telecomputing Workshop, *RUN*, December 1988). While I agree with the article in general, I feel there are a few things you neglected to mention.

Q-Link likes to advertise itself as an inexpensive online service; they even give you a free "Plus" hour. I was disappointed to find that the basic services consist of the newspaper and an encyclopedia. That's nice, but how much of an encyclopedia can anyone read in one sitting? Other functions, such as downloading, Email or anything fun, cost extra. I was amazed at how quickly my free hour of Plus time went by, because 80 percent of that hour was spent waiting for Q-Link to get around to me again.

When I cancelled my membership, a Q-Link sales representative asked me why, and I gave her an earful. I hope Q-Link will consider my comments and improve the system.

—JOSH JACOBY
ONTARIO, CA

C-128 R.I.P.

I'm amazed! Commodore has discontinued the C-128, and I was just about ready to buy one. The 128D sells for $500 with a disk drive, but that's too much to pay. With that money, I'd buy an Amiga 500 with a disk drive. Besides, I already have a 1571 drive, which I had planned to use with the plain C-128 I am now apparently too late to get.

—DAVID DUNSON
WICHITA, KS

Alas, the standard C-128 computer has gone the way of the C-16, Plus/4 and VIC-20—they all are no longer being produced. Perhaps discount or mail-order outlets can help, or maybe one of our readers knows of a distributor who is still selling the machines but doesn't advertise the fact. Write in and let us know.

—EDITORS

GEOKUDOS

As an editor for the GEOS section of a disk-based, monthly newsletter, I recently reviewed *RUN*'s GEOS Power Pak and gave the product a favorable rating. Although I was pleased with the majority of its utilities, I thought the terminal program fell short because it lacked an auto-dial feature. The product could be vastly improved by adding this feature.

—DAVID SWAINBANK
ST. ALBANS, VT

Thanks for the positive review, David. Be assured that the next version of geoTerm, the GEOS terminal program, will *contain the auto-dial capability, among other new features.*

—EDITORS ■

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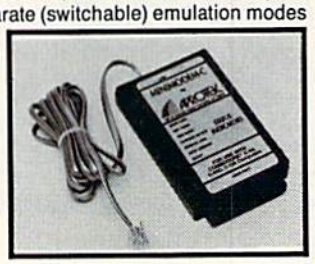

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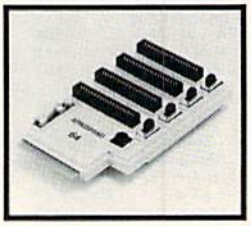

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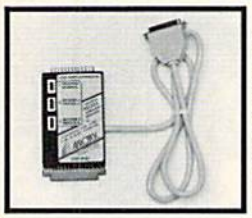

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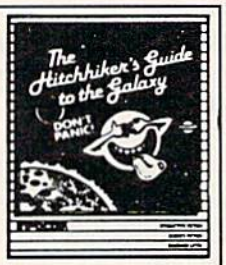

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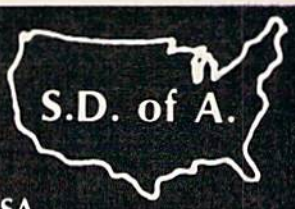

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COMMODORE CLINIC

Commonly asked questions about the 1581 disk drive, transferring text files to an Amiga and dealing with quirks in disk-file programs.

By LOU WALLACE

Q *Is there a nibbler that will copy disks from my 1541 drive to my 1581? Since very few stores sell 3½-inch disks for the 1581, can I purchase them through mail order? Also, is there any software that lets you upload and download from the 1581 drive?*

—SHIBU KINATUKARA
YONKERS, NY

A The 1581 continues to be a mystery to many Commodore users, as your questions so vividly point out. First, there is no such thing as 3½-inch disks made especially for the 1581. All it requires are double-sided, double-density (DSDD) disks, which are the same disks used by the Amiga, the Apple Macintosh and many other computers that use the 3½-inch format. You can order them through the mail if you wish, and in most cases they'll be a little cheaper that way. But almost any computer store carries them.

You cannot use any disk nibbler to copy a 1541 format disk to a 1581 format disk. Nibblers work by reading each track and sector of the disk, then writing them back in the same location on the destination drive. This will not work when copying from a 1541 or 1571 to a 1581. The best way is to use a file copier.

Just about every terminal program I own works with the 1581. Look in the public domain libraries of your local BBS or users group for a good terminal.

Q *I'm a member of the Southeast Louisiana Commodore Users Group, and we have a problem we hope you can help us with, the answer to which might be useful to other users groups as well. Our group consists of C-64, C-128D and Amiga users. We use an Amiga to produce our newsletter, but many of the articles submitted are in standard C-64/128 format. My question is, "How can we transfer and use Commodore text files on an Amiga?"*

—RUSSELL A. DAVIS
LAROSE, LA

A First, make sure your C-64 and 128 authors use a word processor that can save files in ASCII (SEQ) format. If possible, files should be saved in true ASCII format (RUN Script does this nicely) and not just Commodore ASCII. Once the files are in this format, they can be used by the Amiga as soon as they're transferred.

The easiest way I know to transfer is to copy all the files to a 1581 disk, then use a utility called Transfer, supplied with release 2 of the Amiga C-64 Emulator from ReadySoft (PO Box 1222, Lewiston, NY 14092; 416-731-4175). This program allows the Amiga to read 1581 disks and transfer their contents to an Amiga-formatted drive. And, of course, once on the Amiga disk, they'll be available for newsletter production.

A second method is to connect a 64 or 128 to the Amiga by a null modem cable and use a terminal program on both machines to send and receive the ASCII files. This is somewhat inconvenient, as you need to have both machines near one another. Still a third way is to use modems and the phone line to send the files.

Q *Is there an adapter that will let me use my Commodore 64 joysticks on my IBM computer?*

—RODNEY TRAUB
ROCHESTER, MN

A None that I know of. The C64/128 joystick is a simple 8-way directional switch, while those for IBM PCs and compatibles use an analog joystick that has 256 directions. These are more complex and more expensive. But I suspect the price of any adapter designed to use a 64 joystick on an IBM would cost as much, if not more, than the IBM joystick itself. You'd be better off getting one made for your PC.

Q *Help! I started to format a disk, only to discover that I had inadvertently inserted the wrong disk in the drive. I pulled it out quickly, and have been able to get most of my files off it. But every time I try loading the last four files, I get a File not Found error. Since they're on the directory, why can't I load them? Can they be restored?*

—ANDREW VAN BAESCHOTEN
SOMEWHERE IN BELGIUM

A Frankly, you're quite lucky you managed to recover any of the files at all. My guess is that in another few seconds everything on the disk would have been gone for good. The reason you're unable to load the files is that the formatting process had reached the area of the disk where they were actually stored, but before the disk sector where the directory is written. Their names still show up when you read the directory, but the actual files are gone. It's unlikely that you'll be able to get them back, even if you're technically adept and know how to use a disk editor.

Accidentally formatting a disk can be a terrible disaster, and the only foolproof solution is to always keep a backup of important data files or programs. Remember, sooner or later everyone loses data, either by accidental erasure or formatting, hardware failure or even physical damage to the disk itself. In these situations, only a backup will save you. If the data is important, spend the few seconds it takes to duplicate the disk. It can be time well spent.

Q *I'm writing a C-128 relative file database program that uses a sprite as a cursor to move between fields. Sometimes, for no apparent reason, the program just hangs up and the disk light comes on, but control never returns to the program. At other times, when doing exactly the same thing, the program works perfectly. Are there any bugs in relative files on the C-128?*

—JEFFERY BARNES
JACKSONVILLE, FL

A I wouldn't call them bugs, but there definitely are some odd quirks in the file-access system on both the 64 and 128. For example, when programming relative files, it's a good practice (and recommended in the 1571 disk drive manual) to position the relative file pointer not once, but twice

before writing to the record. This ensures that it's always where you think it should be.

Another quirk concerns sprites and disk access. It's a good idea to turn off sprites when accessing the disk drive from within a program, then turn them back on when you've finished reading or writing a file. Sometimes, if one or more sprites are on, you'll get the effect you described. It also makes a difference where the sprite is on the screen. Some screen positions are more prone to this effect than others.

Q *I'm writing a C-128 Basic 7.0 program that plots high-resolution graphs of mathematical equations. I'm using the DEF FN command extensively in the program to allow me to create complex equations and use them almost like new commands. I can even combine functions to create more complex functions in much the same way that some of the more advanced Basics on the newer computers let you create new commands from subroutines. Everything works fine, but as soon as I try to plot the results, my new functions quit working and seem to disappear, giving me an Undefined Function error message! Is there something wrong with the function command?*

—TOM KERTILE
SAN FRANCISCO, CA

A No, there aren't any real bugs, but there is a small requirement to using the DEF FN with bitmap graphics. Unless I'm greatly mistaken, you're defining the functions early in the program, before you allocate the graphics screen. If so, this is your problem. The DEF FN command uses some of the memory where graphics screens are defined. If you allocate a graphics screen before defining the functions, the function definitions will be stored elsewhere in memory and be safe. Otherwise, by defining them first, the definitions will be erased when the graphics screen is created, and you'll get the error message when you try to call them. The best solution is to issue a Graphics command at the beginning of the program, before the DEF FN command is used. ■

Do you have a problem or question about your Commodore computer system, software or programming? Just send your questions to: Commodore Clinic, RUN Magazine, 80 Elm St., Peterborough, NH 03458. Queries are answered only through this column, and, due to the volume of mail, only questions likely to appeal to the majority of our readers can be published.

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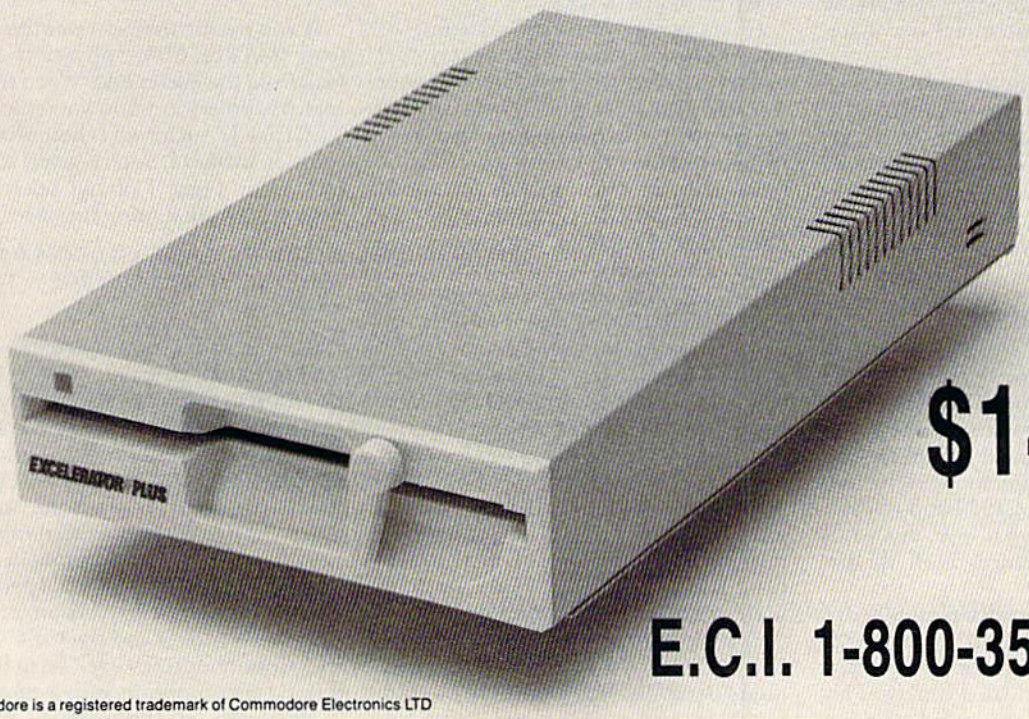

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TELECOMPUTING WORKSHOP

There's a world of information and entertainment awaiting you on local BBSs, including RUN*'s RUNning Board.*

By LOUIS WALLACE

CONTINUING WITH THE TOPIC of telecommunications systems, this month I'll turn the focus to local bulletin board systems (BBSs). In particular, I'll discuss *RUN*'s own BBS, the RUNning Board, where I am the SYSOP.

For the benefit of those who have never previously gone online, what follows is a brief explanation and description of a BBS's features. The traditional bulletin board, such as those you hang in your kitchen or den, is used to leave messages for others. A computer bulletin board is used for the same reason, but in most cases, the available features go beyond merely leaving messages. For example, a BBS can hold lengthy documents like tutorials or articles.

More advanced options include electronic mail (Email) that can be addressed to an individual or to the public. Most modern BBS software packages also let the user send private mail. As the name implies, private mail can only be read by the sender and the person it is addressed to. (On some systems the SYSOP can, if absolutely necessary, read private mail.)

One of the most popular features of a BBS is the ability to upload programs to and download programs from the BBS's private library. Depending on the storage capacity of the BBS, a library can hold anywhere from a few dozen to literally thousands of public domain programs.

The RUNning Board

RUN's RUNning Board contains all of the aforementioned features, and more. To access our BBS, you need either a C-64 or C-128 equipped with a modem and terminal program. You can use just about any modem, including 300-, 1200- or 2400-baud speeds. The BBS detects what you use when you call and configures itself to that speed.

The number for the RUNning Board is 1-603-924-9704. It is available 24 hours a day for anyone to call and sign on as a member. The first time you log on to *RUN*'s BBS, you're asked a few general questions and given a password; you then have access to the system and its resources. Once online, you're presented with a menu of options for each section of the BBS. This makes the RUNning Board extremely easy to use even for first-timers. After you develop some expertise with the system, you can work on two more advanced levels that don't require on-screen menus.

Terminal Software

While almost any general-purpose terminal program can be used to access a BBS, some contain more features than others. The two packages I use most often with the RUNning Board are RUN Term—available on the RUN Works disk—and geoTerm, one version of which is available on *RUN*'s GEOS Power Pak I. Another will soon appear on Power Pak II. There are good commercial terminal programs available, and you can find many public domain packages in your local users group library or online a BBS.

If you're interested in uploading or downloading software, your terminal program must support one or more transfer protocols. These protocols are specialized techniques used in transferring programs and data over phone lines. The two most popular protocols in the Commodore community are Punter and Xmodem. Others that are gaining support are Ymodem (also called 1K Xmodem) and Xmodem-CRC. The RUNning Board supports all of these protocols except Punter, and it has an ASCII Text Transfer mode, which can be used for sending or receiving pure text files.

Downloading and Uploading

As a SYSOP, I find that one of the most commonly asked questions from new users is: "How do I download a program?" Depending on the software used, the specifics for downloading can vary slightly from one BBS to another. For the most part, however, the technique the RUNning Board uses is comparable to other BBSs, so I'll use it as an example.

First, determine what program you want to download. On our system, the software library is broken down into subject categories. A partial listing of the categories we've created so far includes Fun and Games, Productivity, GEOS, Basic 8, The Best of Public Domain, C-128 Only, Graphics, Sound and Music and Magic.

The total number of programs available is in the hundreds. If you select the List option from the Files menu and tell the BBS what category you want, it gives the names, sizes, times required to download and brief descriptions of the files in that category. Here's a short example from Fun and Games:

```
Listing : [A] — Fun and Games
CASTLE.C64    20,352        10/24/88
  C64 graphic adventure
  DwnLds: 14  Trans Time  00:03:39
CREEPS.SDA    15,872        10/26/88
  C64 arcade game in a self-
  dissolving ARC
  DwnLds: 15  Trans Time  00:02:51
```

If you decide that you want to download CASTLE.C64, you select Download from the Files menu. When the BBS asks what file you want, you enter CASTLE.C64. If you haven't chosen a default transfer protocol, you're given some to pick from. Since I always select Xmodem, I get the following message:

```
READY TO SEND CASTLE.C64 USING
XMODEM. PRESS CONTROL-X TO
ABORT.
```

Now, in order to complete the downloading link, instruct your terminal program to begin receiving a download using the same protocol as the BBS. I suggest you determine that before you log on to the BBS, because how you do this depends entirely on the software you're using. With some terminals, this step merely means selecting a Menu option; with others, it's a specialized keypress (the C-128 version of RUN Term uses ALT/D and the C-64 version uses Commodore/D). GeoTerm has you select a menu option with a mouse.

Once you tell the terminal package to receive a file, it handles everything

and simply lets you know how many blocks have been sent. When the file finishes downloading, you're returned to the normal BBS menus.

Uploading a file to a BBS is accomplished in much the same manner, except that you must tell the system what directory to store it in and tell your software to send, instead of receive, a file. Some systems have options for password-protecting uploads so only those who know the password can download the file. And, on many BBSs, including the RUNning Board, you get bonus online time for uploading public domain programs to share with others.

Email

Electronic mail is an important part of any BBS, and the RUNning Board supports it. Users can send and receive messages and letters up to 150 lines in length. While letters can be made public, most personal mail is marked private and is only available to the person it's intended for. Once a message has been sent, it waits until the recipient logs on, then tells him or her that mail is waiting.

One of the nice things about Email is that you can generate dialogues on a lot of different topics. The RUNning Board offers you the option of making multiple replies to a specific message. You can also view replies and follow the trail of a subject that might have built up over a number of weeks.

Another Email feature notifies you when other online folks have received the mail you sent them. This is useful when a long period of time has passed after you originally posted messages. Scanning of messages is also supported, including an option to report only those that were posted since the last time you logged on.

A good way to look for topics is with a Text Search. If you were only interested in messages on games, for example, you can get a list of those messages that have the word "games" in them. Because messages can be categorized in much the same way as programs, you can customize your account to report only on those topics you're interested in.

Join Us!

One of the problems we've had with our BBS concerns the system's capacity. Earlier BBS systems we used were somewhat limited in the number of messages, programs and users they allowed. While systems like these are fine for local BBSs, we needed one with a very large capacity. We settled on Wildcat!, which runs on an IBM-PC dedicated entirely to the BBS. Besides allowing for a 300-, 1200- or 2400-baud modem, we added a 60-megabyte hard disk drive to give us enormous program and Email storage. It also supports over 32,000 users, so we expect it to last us for a year or two.

We welcome and encourage all *RUN* readers to log on to the RUNning Board. The only cost to you is the phone call, and, besides all its other features, the RUNning Board is a great way to ask questions of and get answers from the *RUN* staff.

RUNning on Q-Link

I want to take this opportunity to let you know about another aspect of *RUN*'s commitment to Commodore telecommunications: the *RUN* area on QuantumLink. In cooperation with Quantum Computer Services, we've set up our own private area in the News and Information section of the Commodore Information Network.

Just as on the RUNning Board, we have our own *RUN* Software Libraries, a message section for Letters to the Editor, monthly online articles and a lot more. Staffed entirely by *RUN* editors, it's the perfect place to find programs and information from *RUN*. If you're a Q-Linker, we invite you to stop by and visit with us. ■

Louis Wallace, RUN's technical manager, fills in this month for Telecomputing Workshop's regular columnist, Loren Lovhaug. You can send Lou electronic mail on Q-Link (LRW or LouWallace) or on GEnie (LRWallace).

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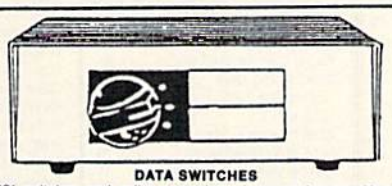

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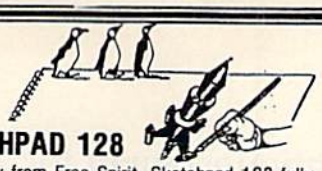

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From p. 31.

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111 DATA 2229293A2ØF92Ø312CC7 2
    8313333293A2ØF92Ø33 2CC7283
    13334293A2ØF9       :REM*165
112 DATA 2Ø352CC728313335293A 2
    Ø9E2ØD128223Ø433Ø3Ø 2229ØØ8
    Ø1D5ØØØ8B2Ø41       :REM*147
113 DATA B2312ØA72Ø41B2323A2Ø 9
    3223Ø3A4F422E525Ø22 2C382C3
    1ØØ8B1D5AØØ9E       :REM*147
114 DATA 2Ø343335320000000AØ
                        :REM*125
115 DATA -1             :REM*226
```

Listing 2. Create RUN Paint Object boot.

```
Ø REM CREATE RUNPAINT OBJECT BO
  OT                    :REM*63
5 OPEN 8,8,8,"OB.BOOT RP,P,W"
                        :REM*19
1Ø READ A$:IF A$="-1" THEN CLOS
  E8:END                :REM*78
15 IF LEN(A$)<62 THEN 55
                        :REM*254
2Ø B$=MID$(A$,1,2Ø)+MID$(A$,22,
  2Ø)+MID$(A$,43,2Ø)    :REM*242
25 FOR I=1 TO 3Ø        :REM*181
3Ø C$=MID$(B$,(I*2)-1,2):H$=LEF
  T$(C$,1):L$=RIGHT$(C$,1)
                        :REM*2Ø9
35 H=VAL(H$):IF H$>"9" THEN H=A
  SC(H$)-55             :REM*85
4Ø L=VAL(L$):IF L$>"9" THEN L=A
  SC(L$)-55             :REM*136
45 BY=H*16+L:PRINT#8,CHR$(BY);
                        :REM*67
5Ø NEXT:GOTO 1Ø         :REM*115
55 IF LEN(A$)<21 THEN B$=A$:GOT
  O 7Ø                  :REM*184
6Ø IF LEN(A$)<42 THEN B$=LEFT$(
  A$,2Ø)+RIGHT$(A$,(LEN(A$)-21
  ):GOTO 7Ø             :REM*137
65 B$=LEFT$(A$,2Ø)+MID$(A$,22,2
  Ø)+RIGHT$(A$,LEN(A$)-42)
                        :REM*14Ø
7Ø FOR I=1 TO LEN(B$)/2:REM*221
75 C$=MID$(B$,(I*2)-1,2):H$=LEF
  T$(C$,1):L$=RIGHT$(C$,1)
                        :REM*14Ø
8Ø H=VAL(H$):IF H$>"9" THEN H=A
  SC(H$)-55             :REM*56
85 L=VAL(L$):IF L$>"9" THEN L=A
  SC(L$)-55             :REM*84
9Ø BY=H*16+L:PRINT#8,CHR$(BY);
                        :REM*148
95 NEXT:GOTO 1Ø         :REM*16Ø
1ØØ REM HEX DATA FOR OB.BOOT RP
                        :REM*242
1Ø1 DATA ØØØCA9ØØ8DØØFFA9ØØA2 Ø
    Ø2Ø68FFA2Ø8A9ØØAØØØ 2ØBAFFA
    22AAØØCA9Ø72Ø       :REM*165
1Ø2 DATA BDFFA2ØØAØ11A9ØØ2ØD5 F
    F4CØØ113Ø3A4F422E52 5ØØØØØØ
    Ø                   :REM*155
1Ø3 DATA -1             :REM*214
```

Listing 3. Create RUN Paint Sys. Stuff file.

```
Ø REM CREATE RUNPAINT SYS.STUFF
  .H FILE               :REM*125
5 OPEN 8,8,8,"SYS.STUFF.H,P,W"
                        :REM*12Ø
1Ø READ A$:IF A$="-1" THEN CLOS
  E8:END                :REM*78
15 IF LEN(A$)<62 THEN 55
                        :REM*254
2Ø B$=MID$(A$,1,2Ø)+MID$(A$,22,
  2Ø)+MID$(A$,43,2Ø)    :REM*242
25 FOR I=1 TO 3Ø        :REM*181
3Ø C$=MID$(B$,(I*2)-1,2):H$=LEF
  T$(C$,1):L$=RIGHT$(C$,1)
                        :REM*2Ø9
35 H=VAL(H$):IF H$>"9" THEN H=A
  SC(H$)-55             :REM*85
4Ø L=VAL(L$):IF L$>"9" THEN L=A
  SC(L$)-55             :REM*136
45 BY=H*16+L:PRINT#8,CHR$(BY);
                        :REM*67
5Ø NEXT:GOTO 1Ø         :REM*115
55 IF LEN(A$)<21 THEN B$=A$:GOT
  O 7Ø                  :REM*184
6Ø IF LEN(A$)<42 THEN B$=LEFT$(
  A$,2Ø)+RIGHT$(A$,(LEN(A$)-21
  ):GOTO 7Ø             :REM*137
65 B$=LEFT$(A$,2Ø)+MID$(A$,22,2
  Ø)+RIGHT$(A$,LEN(A$)-42)
                        :REM*14Ø
7Ø FOR I=1 TO LEN(B$)/2:REM*221
75 C$=MID$(B$,(I*2)-1,2):H$=LEF
  T$(C$,1):L$=RIGHT$(C$,1)
                        :REM*14Ø
8Ø H=VAL(H$):IF H$>"9" THEN H=A
  SC(H$)-55             :REM*56
85 L=VAL(L$):IF L$>"9" THEN L=A
  SC(L$)-55             :REM*84
9Ø BY=H*16+L:PRINT#8,CHR$(BY);
                        :REM*148
95 NEXT:GOTO 1Ø         :REM*16Ø
1ØØ REM HEX DATA FOR SYS.STUFF.
    H FILE              :REM*225
1Ø1 DATA 17F7FFØØØØFFØØØØFFØØ Ø
    ØFFØØØØFFØØØØFFØØØØ FFØØØØF
    FØØØØØØØØØØØ       :REM*35
1Ø2 DATA ØØØØØØØØØØØØØØØØØØØØ Ø
    ØØØØØØØØØØØØØØØØØØØØ ØØØØØØØ
    ØØØØØØØØØØØØ       :REM*42
1Ø3 DATA ØØØØØØØØØ1ØØØØØ8ØØØ Ø
    ØØ1ØØØØ8ØØØØ4ØØØØØ Ø2ØØØØØ
    ØØØØØ2ØØØØØØ4       :REM*9Ø
1Ø4 DATA ØØØØØØØØØØØØØØØØØØØØ Ø
    ØØØØØØØØØØØØØØØØØØØØ ØØØØØØØ
    ØØØØØØØØØØØØ       :REM*4Ø
1Ø5 DATA ØØØØØØØØØØØØØØØØØ1Ø Ø
    Ø1ØØØØØØØØ2ØØ2ØØØØ ØØØ2Ø08
    ØØØØØØØØØ1Ø8        :REM*1Ø7
1Ø6 DATA ØØØØØØØ8ØØØ4ØØØØØØØ 1
    ØØØØØØØ4ØØØØØØØ8ØØ Ø1ØØØØØ
    ØØØØ42ØØØØØØ       :REM*97
1Ø7 DATA Ø4ØØØ4ØØØØØØØ4ØØØ8Ø Ø
    Ø6ØØØØØFØØØØØFØØØØØ 6ØØØØØØ
    ØØØØØØØØØØØØ       :REM*229
1Ø8 DATA ØØØØØØØØØØØØØØØØØØØØ Ø
    ØØØØØØØØØØØØØØØØØØØØ ØØØØØØØ
    ØØØØØØØØØØØØ       :REM*44
1Ø9 DATA ØØØØØØØØØØØØØØØØØØØØ Ø
    ØØØØØØØØEØØØØ3F8ØØØ 7FCØØØF
    FEØØØFFEØØØFF       :REM*26
11Ø DATA EØØØ7FCØØØ3F8ØØØØEØØ Ø
    ØØØØØØØØØØØØØØØØØØØØ ØØØØØØØ
    ØØØØØØØØØØØØ       :REM*112
111 DATA ØØØØØØØØØØØØØØØØØØØØ Ø
    ØØØØØØØØØØØØØØ3CØØ Ø1FF8ØØ
    7FFEØØFFFFØ1F       :REM*142
112 DATA FFF83FFFFC3FFFFC7FFF F
    E7FFFFEFFFFFFFFFFFF FFFFFF7
    FFFFE7FFFFE3F       :REM*177
113 DATA FFFC3FFFFC1FFFF8ØFFF F
    ØØ7FFEØØ1FF8ØØØ3CØØ FØØØØØØ
    ØØØØØØØØØØØØ       :REM*175
114 DATA ØØØØØØØØØØØØØØØØØØØØ Ø
    ØØØØØØØØØØØØØØØØØØØØ ØØØØØØØ
    ØØØØØØØØØØØØ       :REM*54
115 DATA ØØØØØØØØØØØØØØØØØØØØ Ø
    ØØØØØØØØØØØØØØØØØØØØ ØØØØØØF
    FØØØØØØØØØØØ       :REM*151
116 DATA ØØØØØØØØØØØØØØØØØØØØ Ø
    ØØØØØØØØØØØØØØØØØØØØ ØØØØØØØ
    ØØØØØØØØØØØØ       :REM*52
117 DATA ØØØØØØØØØØØØØØØØØØØØ Ø
    ØØØØØØØØØØØØØØØØØØØØ ØØØØØØØ
    ØØØØØFFØØØØFF       :REM*1Ø7
118 DATA ØØØØFFØØØØFFØØØØFFØØ Ø
    ØFFØØØØFFØØØØFFØØØØ ØØØØØØØ
    ØØØØØØØØØØØØ       :REM*252
119 DATA ØØØØØØØØØØØØØØØØØØØØ Ø
    ØØØØØØØØØØØØØØØØØØØØ ØØØØØØØ
    ØØØØØØØØØØØFF       :REM*173
12Ø DATA FFØØFFFFØØFFFFØØFFFF Ø
    ØFFFFØØFFFFØØFFFFØØ FFFFØØF
    FFFØØFFFFØØFF       :REM*1Ø8
121 DATA FFØØFFFFØØFFFFØØFFFF Ø
    ØFFFFØØFFFFØØFFFFØØ ØØØØØØØ
    ØØØØØØØØØØØØ       :REM*16Ø
122 DATA ØØØØ8ØØØØ4ØØØØ2ØØØ Ø
    Ø1ØØØØØ8ØØØØ4ØØØØ Ø2ØØØØØ
    1ØØØØØØØØØØØ       :REM*1Ø6
123 DATA ØØØØØØØØØØØØØØØØØØØØ Ø
    ØØØØØØØØØØØØØØØØØØØØ ØØØØØØØ
    ØØØØØØØØØØØØ       :REM*61
124 DATA ØØØØØØØØØØ1ØØØØØ2ØØ Ø
    ØØ4ØØØØ8ØØØØ1ØØØØØ 2ØØØØØ4
    ØØØØ8ØØØØØØ        :REM*177
125 DATA ØØØØØØØØØØØØØØØØØØØØ Ø
    ØØØØØØØØØØØØØØØØØØØØ ØØØØØØØ
    ØØØØØØØØØØØØ       :REM*3
126 DATA ØØØØØØØØØØØØØØØØ1F1F 8
    E8E4444E8E8F1F1E2E2 44442E2
    E1F1F8E8E4444       :REM*222
127 DATA E8E8F1F1E2E244442E2E A
    AAAFFFF5555FFFFAAAA FFFF555
    5FFFFAAAAFFFF       :REM*132
128 DATA 5555FFFFAAAAFFFF5555 F
    FFFFFFFCCCCFFFF3333 FFFFCCC
    CFFFF3333FFFF       :REM*59
129 DATA CCCCFFFF3333FFFFCCCC F
    FFF3333888811112222 4444888
```

►

```
    8111122224444          :REM*6Ø
13Ø DATA 88881111222244448888 1
    11122224444B4B44B4B D2D22D2
    D24D2DB2D4AB4          :REM*176
131 DATA B54B2D2DD2D2B4B44B4B 4
    B4BB4B42D2DD2D2A185 43C2A66
    51C381818381C          :REM*1Ø1
132 DATA 65A6C243C423624635AC 1
    8181C38A66543C2A185 2C345A5
    AB18D6186C183          :REM*164
133 DATA 418221841FF81FF82184 4
    182C1836186B18D5A5A 2C34494
    9949422224141          :REM*2Ø7
134 DATA 88884141222294944949 2
    222141488881414222 4949949
    44Ø4Ø4Ø4Ø4Ø4Ø          :REM*171
135 DATA AØAØ1111ØAØAØ4Ø4Ø4Ø4 Ø
    4Ø4Ø4Ø4Ø4Ø4ØAØA1111 AØAØ4Ø4
    Ø4Ø4Ø39394444          :REM*228
136 DATA 8282Ø1Ø1Ø1Ø1Ø1Ø18282 4
    444393944448282Ø1Ø1 Ø1Ø1Ø1Ø
    182824444FEFE          :REM*51
137 DATA FEFEC2C2C2C2C2C2C2C2 F
    EFEØØØØEFEFEFEF2C2C 2C2C2C2
    C2C2CEFEFØØØØ          :REM*226
138 DATA ØØØØØØØØØØØØØØØØØØØØ Ø
    ØØØØØØØØØØØØØØØØØØ ØØØØØØØ
    ØØØØØØØØØØØØØ         :REM*14
139 DATA ØØØØFFFFFFFFFFFFFFFF F
    FFFFFFFFFFFFFFFFFFFF FFFFFFF
    FFFFFFFFFFFFF          :REM*162
14Ø DATA FFFFFFFF3Ø3ØFCØØ3FØØ Ø
    FCØØ3Ø3CØØFØØ3FØØFC 3Ø3ØFCØ
    Ø3FØØØFCØØ3Ø3          :REM*112
141 DATA CØØFØØ3FØØFCCØC0 3333 Ø
    CØC3333CØCØ3333ØCØC 3333CØC
    Ø3333ØCØC3333          :REM*1Ø
142 DATA CØCØ3333ØCØC3333C7C7 8
    383Ø1Ø1Ø1Ø1Ø1Ø13939 7D7DFFF
    F7C7C38381Ø1Ø          :REM*233
143 DATA 1Ø1Ø1Ø1Ø9393D7D7FFFF Ø
    1Ø11111Ø1Ø1Ø1Ø13939 5555939
    31Ø1Ø1Ø1Ø1111          :REM*138
144 DATA 1Ø1Ø3838444483831111 Ø
    1Ø1FFFF8888FFFF8888 FFFF888
    8FFFF8888FFFF          :REM*234
145 DATA 8888FFFF8888FFFF8888 F
    FFF88881F1F8E8E4444 E8E8F1F
    1E2E244442E2E          :REM*159
146 DATA 1F1F8E8E4444E8E8F1F1 E
    2E244442E2EB1B13Ø3Ø Ø3Ø31B1
    BD8D8CØCØØCØC          :REM*14
147 DATA 8D8DB1B13Ø3ØØ3Ø31B1B D
    8D8CØCØØCØC8D8DFFFF 8Ø8Ø8Ø8
    Ø8Ø8ØFFFFØ8Ø8          :REM*1Ø3
148 DATA Ø8Ø8Ø8Ø8FFFF8Ø8Ø8Ø8Ø 8
    Ø8ØFFFFØ8Ø8Ø8Ø8Ø8Ø8 AAAAAAA
    AAAAAAAAAAAAA          :REM*149
149 DATA AAAAAAAAAAAAAAAAAAAA A
    AAAAAAAAAAAAAAAAAA AAAAAAA
    A5555AAAA5555          :REM*23Ø
15Ø DATA AAAA5555AAAA5555AAAA 5
    555AAAA5555AAAA5555 AAAA555
    5FFFFØØØØFFFF          :REM*66
151 DATA ØØØØFFFFØØØØFFFFØØØØ F
    FFFØØØØFFFFØØØØFFFF ØØØØFFF
    FØØØØCCCC3333          :REM*217
152 DATA CCCC3333CCCC3333CCCC 3
    333CCCC3333CCCC3333 CCCC333
    3CCCC33338Ø8Ø          :REM*13
153 DATA Ø1Ø1Ø2Ø2Ø4Ø4Ø8Ø81C1Ø 2
    22Ø41CØ8Ø8Ø0Ø1Ø1Ø2Ø2 Ø4Ø4Ø8Ø
    81C1Ø222Ø41CØ          :REM*135
154 DATA CCCCCCCCCCCCCCCCCCCC C
    CCCCCCCCCCCCCCCCCC CCCCCCC
    CCCCCCCCCCCC           :REM*44
155 DATA CCCC8F8F8F8F7777F8F8 F
    8F8F8F877778F8F8F8F 8F8F777
    7F8F8F8F8F8F8          :REM*8Ø
156 DATA 77778F8FØØØØ1Ø1Ø1Ø1Ø 5
    454BABA1Ø1Ø1Ø1ØØØØØ ØØØØØ1Ø
    ØØ1ØØØ54ØØBAØ          :REM*96
157 DATA Ø1ØØØ1ØØØØØØØØØØ2Ø2Ø A
    8A87Ø7Ø2Ø2Ø2Ø2Ø2Ø2Ø ØØØØØØØ
    ØØ1Ø145458383          :REM*158
158 DATA Ø1Ø1Ø1Ø1Ø1Ø1ØØØØ1111 8
    8884444222211118888 4444222
    2111188884444          :REM*181
159 DATA 22221111888844442222 3
    333FFF3ØØ33FFF33333 F3FF33Ø
    ØF3FF3333FFF3          :REM*45
16Ø DATA ØØ33FFF33333F3FF33ØØ F
    3FFFAAFØAA8FAAFØAA8 FFFFA8Ø
    AAFFAA8ØAAFFA          :REM*123
161 DATA A8ØAAFFAA8ØAFFFFØAA8 F
    AAFØAA81111A8A84444 8A8A111
    1232345458989          :REM*225
162 DATA 1111A2A244442A2A1111 9
    89854543232FFE3Ø222 Ø222Ø22
    2FE3F222Ø222Ø          :REM*136
163 DATA 222ØE3FF22Ø222Ø222Ø2 3
    FFE2Ø222Ø222Ø221111 FFFF4Ø4
    Ø4Ø4ØFFFFØ4Ø4          :REM*72
164 DATA Ø4Ø4FFFF4Ø4Ø4Ø4ØFFFF Ø
    4Ø4Ø4Ø4FFFF11111111 ØØFFØØF
    FØØFFØØFFØØFF          :REM*213
165 DATA ØØFFØØ6ØØØ8Ø          :REM*77
166 DATA -1                    :REM*2Ø
```

Listing 4. File Creator program.

```
Ø REM OB.RP FILE CREATOR
                       :REM*231
5 OPEN 8,8,8,"OB.RP,P,W" :REM*Ø
1Ø READ A$:IF A$="-1" THEN CLOS
   E8:END              :REM*78
15 IF LEN(A$)<62 THEN 55
                       :REM*254
2Ø B$=MID$(A$,1,2Ø)+MID$(A$,22,
   2Ø)+MID$(A$,43,2Ø)  :REM*242
25 FOR I=1 TO 3Ø       :REM*181
3Ø C$=MID$(B$,(I*2)-1,2):H$=LEF
   T$(C$,1):L$=RIGHT$(C$,1)
                       :REM*2Ø9
35 H=VAL(H$):IF H$>"9" THEN H=A
   SC(H$)-55           :REM*85
4Ø L=VAL(L$):IF L$>"9" THEN L=A
   SC(L$)-55           :REM*136
45 BY=H*16+L:PRINT#8,CHR$(BY);
                       :REM*67
5Ø NEXT:GOTO 1Ø        :REM*115
55 IF LEN(A$)<21 THEN B$=A$:GOT
   O 7Ø                :REM*184
6Ø IF LEN(A$)<42 THEN B$=LEFT$(
   A$,2Ø)+RIGHT$(A$,(LEN(A$)-21
   )):GOTO 7Ø          :REM*176
65 B$=LEFT$(A$,2Ø)+MID$(A$,22,2
   Ø)+RIGHT$(A$,LEN(A$)-42)
                       :REM*14Ø
7Ø FOR I=1 TO LEN(B$)/2:REM*221
75 C$=MID$(B$,(I*2)-1,2):H$=LEF
   T$(C$,1):L$=RIGHT$(C$,1)
                       :REM*14Ø
8Ø H=VAL(H$):IF H$>"9" THEN H=A
   SC(H$)-55           :REM*56
85 L=VAL(L$):IF L$>"9" THEN L=A
   SC(L$)-55           :REM*84
9Ø BY=H*16+L:PRINT#8,CHR$(BY);
                       :REM*148
95 NEXT:GOTO 1Ø        :REM*16Ø
1ØØ REM OB.RP HEX DATA :REM*1Ø7
1Ø1 DATA ØØ11A2ØØAØ83ADFCFFC9 E
    2FØØ4A28ØAØ87862C8C 7621A9Ø
    Ø2ØB714A92B8D      :REM*13Ø
1Ø2 DATA 11DØA9Ø82Ø6Ø14A9Ø92Ø 6
    Ø142Ø411228F18ØØØC 58Ø1ØØ2
    ØCC178412ØBØØ      :REM*135
1Ø3 DATA 1FØØ78AD14Ø38D9515AD 1
    5Ø38D9615A92A8D14Ø3 A9158D1
    5Ø3A91F8D18Ø3       :REM*181
1Ø4 DATA A9128D19Ø358A9Ø18D2C 8
    Ø2Ø8Ø37AD2C8Ø8D21DØ 2Ø32142
    Ø74132Ø3D3F2C       :REM*159
1Ø5 DATA 87ØC1ØØ5AD88ØC852ØA9 Ø
    Ø8D87ØC8D96ØC8D9FØC 8D81ØC2
    ØCF242ØEF18AD       :REM*12
1Ø6 DATA D5148D2ØDØ2ØBD134C9F 1
    12ØØ114C985DØØ32ØBØ 15C986D
    ØØ32ØB615DØED       :REM*7Ø
1Ø7 DATA 2C81ØC1ØØDADØØØC3Ø08 2
    Ø671CA9Ø08D81ØC2Ø32 142Ø741
    32Ø3D3F2C81ØC       :REM*4Ø
1Ø8 DATA 3Ø16A97Ø2C87ØC1ØØA2Ø B
    E24AD88ØC852Ø1Ø05FØ Ø92Ø444
    52ØCF244CF911       :REM*225
1Ø9 DATA 2C96ØC1ØØ32ØEE3B2ØD2 2
    42Ø411228D13A2Ø08E 9DØC8E8
    1ØC8E87ØC865A       :REM*2Ø6
11Ø DATA 8E9FØCE88667ADD5148D 2
    ØDØA2BAAØ224C4B1B24 2C1ØØ96
    88DØØFF68A868       :REM*17
111 DATA AA684ØA917AØF7A23FDØ 1
    6A98Ø8523A971AØ24A2 18DØØAA
    9ØØ8523A959AØ       :REM*249
112 DATA 24A2ØC8D5F128C61128E 6
    3122ØBF188Ø5B8ØØØØØ 2ØCC175
    924CØ5BØCØØ2Ø       :REM*47
113 DATA CC17652485BØCØØ2ØBF 1
    8F85F4ØØ6EEEF85FA9 ØØ8DFE5
    FA96Ø8DFF5F6Ø       :REM*141
114 DATA B7ØØ95ØØØØØØØØ8ØØØ Ø
    ØØØØØØØ18ØØ57Ø12DFE ØØØØØ2Ø
    ØØØØ4ØØ1C8ØØ        :REM*114
115 DATA 4ØØFØFØAØAØEØEØDØDB7 9
    5ØØØØØØØØØØØØØØØØØØ ØØØØØØØ
    ØØØØØ3BFFAAAA       :REM*13Ø
116 DATA Ø1C8Ø78AAAAØØØØØØ2Ø C
    F129ØFB6Ø2Ø253A9ØØC 189ØØFA
    9FE2CA92DC5ØD       :REM*195
117 DATA DØ18782ØEC129ØØ4A9ØØ 8
    514586ØA92Ø2414FØØ6 24133ØØ
    2386Ø186Ø78A9       :REM*152
118 DATA 2Ø2414FØF724133ØF11Ø F
    12ØBF18ØØØ93FØØØØ2Ø CC17592
```

RUN PAINT

```
    4000900C00A924          :REM*74
119 DATA 8DF807A9932004514A999 2
    004514A9008D20D08D21 D0AD00D
    D09038D00DDA9           :REM*14
120 DATA 178D18D0A91B8D11D0A9 C
    88D16D0242C1006A501 29FB850
    160AD00DD29FC           :REM*162
121 DATA 09028D00DD78A01DB9AB 1
    2C9AAF003990D0881 F3586A
    9008D810C1008           :REM*106
122 DATA AD20D0490F8D20D02051 1
    3AD2C80207F1C24293 21A9E0A
    01320D013AD16           :REM*145
123 DATA D029EF8D16D0A9408529 8
    D2B80242C1006A501090 0485016
    0A9E5A01320D0           :REM*121
124 DATA 13AD16D00910 8D16D0A9 8
    0D0DD20CC17921219000 0600608
    50B860C840D4C           :REM*26
125 DATA 7F168DD9138CDA1320CC 1
    7E013A10C05006030F01 07F9019
    F0003FD0385 06          :REM*14
126 DATA 8607840808688505A90E 8
    D00FF8DDE02A90F8502 6020EA1
    3A9E4A2FF242C           :REM*220
127 DATA 300D8503860420EF1820 2
    0146C03008504860320 CD02A50
    548A607A5 0628          :REM*190
128 DATA 6020EA13A9CCA2FFD0D6 2
    02914A97F20EA13A9C3 A2FFD0C
    8204314A90D20           :REM*250
129 DATA EA13A9D2A2FFD0BA20EA 1
    3A9BAA2FFD0B120EA13 A9BDA2F
    FD0A8AAA00F20           :REM*139
130 DATA 4E14A9002057142001D29 2
    0EA13A9C0A2FFD09124 2C30016
    020EA13A968A2           :REM*2
131 DATA FFD083A000A2051820EA 1
    3A9F0A2FFD0F020EA13 A9C9A2F
    FD0E720EA13A9           :REM*7
132 DATA C6A2FFD0DE20EA13A9D5 A
    2FFD0D520EA13A9D8A2 FFD0CC2
    0EA13A990A2FF           :REM*247
133 DATA D0C304000707000808FF 4
    E00D000D80515050101 0101020
    0100080100909           :REM*21
134 DATA 0808080000000000000 0
    0000000000000700010 0000000
    0000000000000           :REM*96
135 DATA 0000000000020008F8FF00 0
    0F0FF0000000001E000 0204171
    4243030A595445          :REM*227
136 DATA 0010026E001B00FF414E 4
    432425954450000E242C 1013AD1
    1D0297F8D11D0           :REM*187
137 DATA A9FF8D12D0AD19D08D19 D
    024223040FC6222 0F215 20D7129
    006A066A911D0           :REM*19
138 DATA 0920DA12901 8A911A0B2 7
    8A2FF9A489848A93248 4848482
    42C1003A90E48           :REM*38
139 DATA A5240D120C3013C621D0 0
    FA902852 1EE27D0AD27 D029072
    09715A9808 52B          :REM*152
140 DATA A900852240 31EA8D27D0 8
    D28D08D29D08D2AD060 20B0154
    C2B1B20B6154C           :REM*36
141 DATA 2B1BA0F2A915D004A0B8 A
    916788C48158D491558 6000040
    6000C100E000A           :REM*34
142 DATA 0200000000FF01FF0100 0
    1010001FF01FF00FFFF 0000000F
    D03FD03000303           :REM*109
143 DATA 0003FD03FD00FDFD2013 1
    7AD00DCCD00DCD0F829 0FA8B9B
    E15D0028517A8           :REM*190
144 DATA A517C90FB00FE617A905 C
    ECF14D0058DCF14F007 60C923B
    00BE617BECE15           :REM*212
145 DATA B9CF154C3216BEE015B9 E
    1152424100160 1865 0D C916B00
    2A9FEA41DC51D           :REM*95
146 DATA 9008A41EC51E9003F001 9
    8850D8A85181865 0B85 0BA9002
    4181002A9FF65           :REM*38
147 DATA 0C850CA619A41AE40B98 E
    50CB00BA61BA41CE40B 98E50CB
    00486 0B840CA5          :REM*229
148 DATA 0B38E918242310 0229F8 8
    50FA50CE9008510A50F 1869188
    D00D0AD1 0D029          :REM*191
149 DATA FE050C8D10D0A50D38E9 3
    224231 00229F8851118 69328D0
    1D0602 01317AD          :REM*81
150 DATA 00DC293F098080D00DCA2 6
    6EAEAEACAD0FAAD1AD4 ACDB142
    0F0168CDB1418           :REM*6
151 DATA 49FF690148AD19D4ACDA 1
    420F0168CDA14AA684C 3216841
    5851638E51529           :REM*130
152 DATA 7FC940B0064A4AF00FD0 0
    A09C0C9FFF007386A38 6AA4166
    0A9006 0AD00DC          :REM*124
153 DATA 2910CDD914F00E8DD914 0
    A0A0A8513A514092085 1460A90
    02CA90F851760           :REM*168
154 DATA 297FC940900200980C920 B
    002094060 29FF1005 29 7F094 06
    0C960900 3295F          :REM*127
155 DATA 60293F60A048B9000029 F
    88552B901008553B902 0040A42
    9FEA818B9FC34           :REM*232
156 DATA 65528552A55379FD3485 5
    360A048B9010040AB900 0060A4A4
    A48B902004A4A           :REM*253
157 DATA 29FEA86818792E35854C B
    92F3569 00854DA54D29 03090D88
    54FA54C854E60           :REM*190
158 DATA 8655AE0C0C8554982008 1
    918655485548A655585 5560A00
    6A2442040184C           :REM*246
159 DATA E517A93F85478546A006 2
    CA004A244204018207A 184CE51
    7207218A02BB9           :REM*213
160 DATA F31799000 2881 0F74C00 0
    2A000C443D00CC6441 0 08A90E8
    D00FF4CEF18A6           :REM*122
161 DATA 468E00FFB13FA6478E00 F
    F9141C8D0DFE640E642 D0D9F0D
    F242C3003B13F           :REM*128
162 DATA 60A93F8DAA02A6464CA2 0
    2242C3003914160A241 8EB902A
    6474CAF026885           :REM*232
163 DATA 3B68853C68853D68853E 9
    848B13D9500CA88D0F8 68A8186
    53DAAA9006 53E          :REM*103
164 DATA 488A48A53C48A53B4860 4
    8A90F48A932D00E48A9 3E48A93
    5D00648A93F48           :REM*222
165 DATA A9302420300378850168 8
    D00FF68602 0BF18006 401F00A
    D2C808D21D08D           :REM*195
166 DATA B3180DD7148DAB1820BF 1
    8005CE803002 0B51800 D8E8030
    06 0A93E85472 0         :REM*211
167 DATA 72184CC618A93F85472 0 7
    A18A005A2452040 18A5 454CD61
    886418442A241           :REM*237
168 DATA 8EB902A000C443D004C6 4
    4300A202F18C8D0F2E6 42D0EE4
    8A90E8D00FF24           :REM*222
169 DATA 2C3004A93685 0168586 0 A
    E05D04C0F19A208E000 D0028A6
    0CA86358534A9           :REM*109
170 DATA 0018A209D00490026535 6
    A6634CAD0F6AAA5346 0 A901CA3
    0040A4C2A196 0          :REM*88
171 DATA 843485358636A9008537 A
    9008539A01006342635 2A26394
    8C536A539E537           :REM*163
172 DATA 9000853968E53648E634 6
    888D0E48538A5346 0A9 0 08539A
    01146396A6635           :REM*126
173 DATA 663490 0B18653648A537 6
    53985396888D0E98538 A535A43
    4608 48A55E8537         :REM*112
174 DATA 688DC90C98488AA43799 C
    A0C6899C90C88D0FA6 0 863B853
    CA000B13B0829           :REM*114
175 DATA 7F99CA0CC8281 0F460A9 2
    4A225A000208 7192465 5002302
    AA56318690585           :REM*77
176 DATA 639002E664B163AAC8B1 6
    320A0192465301 28437 A92599C
    A0CA548C55BF0           :REM*209
177 DATA 05C6372 03B1AE6372 07C 1
    7A437A536914CA900CD 2C80D00
    2A9 01914E881 0         :REM*73
178 DATA EE2 05617A0FF8444E644 A
    444C437F00390016 0B9 C90CA8A
    9F1A2228655A2           :REM*133
179 DATA 0820B117A007B1542429 1
    00249AA9152881 0F32 0 451A4C0
    C1A20CC17CA0C           :REM*201
180 DATA C90C27006 0A900 8186552 8
    5529002E6536 0A55B85 48A55C8
    549A90818654A           :REM*41
181 DATA 854A60A9202465D00D20 8
    51AB0082 05617A65ECA 1001602
    0451AA007B152           :REM*14
182 DATA 49FF9152881 0F73 0ECA5 4
    A38E908C55D900869 0F C562B00
    2186 0386 0A558         :REM*112
183 DATA 8563A5598564A005B158 9
    95B00994800881 0F5A5 5E20061
    9186910900 1E8          :REM*243
184 DATA 18655B856 08A655C8561 A
    55F8565291F855F8566 A900856
    8A91EA220A01F           :REM*45
185 DATA 2087192 0EC192 0511AD0 0
    724651 00320511A20B3 1924653
    023A437C898 0A          :REM*213
186 DATA 0A0A1865488548900 2E6 4
    9A66838E9049DB3 0CA5 49E9009
    DB4 0CE8E88668          :REM*77
187 DATA C666D0CB20511AA921A2 2
    3A0222087192 0EC192 0 591A856 ►
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    26ØA658A459A9        :REM*152
188 DATA ØØ8567FØ168631A65AA5 5
    89DABØCA5599DACØCE8 E8865A8
    667A631865884        :REM*2Ø4
189 DATA 59A9ØØ8523A65ABDA312 A
    C2C8ØDØØ2Ø91Ø85362Ø 981AA92
    Ø246550ØBDØØ6        :REM*141
19Ø DATA 2ØFA374C751B2ØD945A5 6
    7FØØ9A55D18693EA82Ø CB13246
    51Ø212Ø611A24        :REM*95
191 DATA 651Ø1AA511C54A9ØØ8A5 4
    A69Ø6C511BØØC2Ø611A A51129F
    8854A4C821B2Ø        :REM*5Ø
192 DATA 2F17A511C562BØ18C55D 9
    Ø14A5ØFC55BA51ØE55C 9ØØAA5Ø
    FC56ØA51ØE561        :REM*69
193 DATA 9ØØ34C3F1C2ØEØ129ØB9 A
    9Ø885432Ø611AA9Ø12Ø 5542C64
    3DØF424651ØØ7        :REM*1
194 DATA 2Ø851ABØAØ9Ø1AA2ØØE4 6
    8BØ4EA5ØFDDB3ØCA51Ø FDB4ØCE
    8E8BØEE8A4A85        :REM*214
195 DATA 31DØØEA54A38E55D4A4A 4
    A8531246570260AØA65 3169Ø2A
    8B158Ø8C8B158        :REM*141
196 DATA AAC8B15828FØØ4A84C35 1
    B8E371C8D381CA6318E AAØC4C9
    F11AØØ4A9ØØFØ        :REM*193
197 DATA DDA65AFØ1E24655ØØ32Ø 6
    71C2ØA324A65ABCAAØC BDA9ØCC
    ACA865AAAA9ØØ        :REM*177
198 DATA 85674C4B1B2ØCF244C66 1
    1AD21DØ29ØFCD2C8ØFØ Ø8482Ø8
    83868Ø7F1C6Ø         :REM*41
199 DATA AD21DØ29ØF8D2C8Ø8D21 D
    ØØAØAØAØA8DD6146ØØØ ØØ99ØØØ
    Ø98ØØØØ189ØØØ        :REM*57
2ØØ DATA Ø012Ø5Ø6ØCØ5Ø314ØØØF 8
    EØØØØ3Ø112Ø4ØØ12Ø5 131412Ø
    9Ø314Ø584ØØØØ        :REM*166
2Ø1 DATA 121693ØØØØ4Ø9138BØØ Ø
    ØØ4Ø5Ø6Ø9ØE851BØØØ1 Ø6Ø6Ø5Ø
    314ØØØ3ØFØCØF        :REM*66
2Ø2 DATA 92ØØØ13ØFØCØ9841BØØ Ø
    EØF12ØDØ18CØØØØ4ØF 15Ø2ØC8
    5ØØØ1115Ø1Ø4         :REM*146
2Ø3 DATA 12151ØØC851BØØØEØF12 Ø
    DØ18CØØØØ4ØF15Ø2ØC 85ØØØØ1
    115Ø1Ø4121515Ø       :REM*181
2Ø4 DATA ØC851BØØØ3ØF16Ø592ØØ Ø
    Ø12169ØØØØØF92ØØØØ Ø1ØEB4Ø
    ØØØ18ØF924F57        :REM*173
2Ø5 DATA 5F6A727A858C91959A13 Ø
    5ØCØ5Ø314ØØØ3ØFØCØF 921BØØ1
    513Ø5ØØ1ØØ58E        :REM*168
2Ø6 DATA ØØØØ1513Ø5ØØØ2121513 8
    8ØDØF16Ø5ØØØDØ91212 ØF9213Ø
    514ØØ12Ø5Ø6ØC        :REM*195
2Ø7 DATA Ø5Ø3941 3Ø5ØCØ5Ø314ØØ 1
    ØØ58E13Ø5ØCØ5Ø314ØØ Ø212151
    38813Ø5ØCØ5Ø3        :REM*84
2Ø8 DATA 14ØØ1ØØ1141 4Ø5128E8Ø Ø
    ØØØ2B2B2B2BABØØØØ22 222222A
    2ØØØØ2C2C2C2C        :REM*82
2Ø9 DATA ACØØØØ28282828A8ØØØØ 2
    9292929A9ØØØØ2AØØ2A ØØAAØØØ
    Ø18ØF8A371D8Ø        :REM*192
21Ø DATA 381E431DØØ98474C1DØØ 9
    247C71CØØE747971CØØ 7547621
    D8Ø241E571DØØ        :REM*197
211 DATA B23B6D1D8ØØ11E771D8Ø F
    31D831D8ØFA1DØ8ØØ68 24E3F74
    6Ø8ØØ7Ø24E4E7        :REM*168
212 DATA 46Ø8ØØ6ØØ986921DØØC3 4
    7991DØØCØ47A01DØØAA 47A71DØ
    ØAD47AE1DØØBØ        :REM*45
213 DATA 47B51DØØB347Ø8ØØ5ØØ9 8
    39Ø1CØØ5A478D1CØØ54 47931CØ
    Ø6Ø47Ø8ØØ28Ø7        :REM*255
214 DATA DØD147Ø31594Ø3ØF1Ø99 1
    ØØ1131485Ø512Ø11385 ØØØØØ6Ø
    CØ91ØØØ98ØØØ        :REM*213
215 DATA Ø6ØCØ91ØØØ99ØØØØ1216 9
    3ØØØØØ3ØF16Ø5922ØØØ 18Ø9883
    F1EØØ1942421E        :REM*86
216 DATA ØØØD42461EØØ99434B1E Ø
    Ø27425Ø1EØØBB644581E ØØBC446
    Ø1EØØBØ44651E        :REM*57
217 DATA ØØAA44Ø1ØC14Ø512ØØØ3 Ø
    FØCØF9217Ø11388Ø6ØC ØFØF84Ø
    612Ø5Ø5Ø8Ø1ØE        :REM*188
218 DATA 84ØCØ9ØEØ59312Ø11993 1
    31Ø12Ø199Ø512Ø113Ø5 92Ø5Ø4Ø
    994Ø5ØCØCØ91Ø        :REM*1Ø2
219 DATA 1385Ø2ØF981ØØ918Ø58C Ø
    21215138810Ø1141405 128EØ6Ø
    FØE94Ø3Ø11284        :REM*22Ø
22Ø DATA 13Ø312Ø5Ø58EØCØ9Ø7Ø8 9
    4ØD Ø5Ø4Ø9158DØ8Ø5Ø1 1699ØØ
    Ø18ØC8C991E8Ø        :REM*8Ø
221 DATA 5B1FA41E8Ø911FA81E8Ø 9
    81FAD1EØØ4C3AB51EØØ EE39BA1
    EØØA539BE1E8Ø        :REM*234
222 DATA 471FC31EØØ423AC91E8Ø 7
    81FCD1EØØAF35D41EØØ 7435D51
    CØØ4F3948Ø058        :REM*171
223 DATA Ø883F61EØØ2A3AFB1EØØ 2
    A3AØ11FØØ2A3A48ØØ2Ø Ø882EC1
    E8Ø6A1FFØ1E8Ø        :REM*126
224 DATA 711F5ØØØ3Ø07D Ø3F4C5Ø Ø
    Ø38Ø7DØCD4C48ØØ68Ø8 84D71EØ
    Ø9D48DC1EØØ17        :REM*213
225 DATA 48E11EØØ2D48E81EØØFB 4
    748ØØ3Ø07DØ313A48ØØ 38Ø7DØ5
    F3DØ6ØFØE9417        :REM*25
226 DATA Ø9Ø4148Ø8Ø5Ø9Ø7Ø894 Ø
    ØØØØØØØØØØØØØØØØ ØØ8Ø071
    2Ø11ØØ8Ø9Ø393        :REM*198
227 DATA 14Ø5189468ØØ18Ø7889F 1
    F8ØF31FA31F8ØØ72ØA8 1F8Ø1B2
    Ø121DØØ224D19        :REM*172
228 DATA 1DØØ224D1E1DØØ224D22 1
    DØØ224D271DØØ224D7Ø ØØ28ØD8
    3AE1FØØ3E4DBA        :REM*221
229 DATA 1FØØ3E4DC21FØØ3E4D7Ø Ø
    Ø3ØØC83DC1CØØEE4CE4 1CØØEE4
    CEC1CØØEE4C7Ø        :REM*178
23Ø DATA ØØ38ØC83F71CØØØ84DFF 1
    CØØØ84DØ71DØØØ84D13 Ø312Ø5Ø
    5ØEØØØ3ØFØCØF        :REM*255
231 DATA 92Ø7ØF148FØ31512 13ØF 9
    2Ø3ØCØ5Ø112ØØ13Ø312 Ø5Ø58EØ
    3ØCØ5Ø112ØØ1Ø        :REM*77
232 DATA Ø1Ø7851Ø12Ø9ØE941115 Ø
    994Ø4Ø516Ø9Ø3851BØØ Ø8Ø912Ø
    593ØØØØØD5Ø4         :REM*1Ø2
233 DATA 12Ø593ØAØF191314Ø9Ø3 8
    BØDØF151385ØCØ5Ø694 ØDØ94Ø
    4ØC8512Ø9Ø7Ø8        :REM*249
234 DATA 9414ØF9ØØ2ØF1414ØF8D 1
    3Ø312Ø5Ø5ØEØØ159Ø13 Ø312Ø5Ø
    5ØEØØØ4ØF178E        :REM*93
235 DATA 13ØFØCØ984Ø6ØCØ11388 1
    2Ø5Ø314Ø1ØE07ØC8513 Ø5ØCØ5Ø
    314ØØ1Ø12Ø9ØE        :REM*132
236 DATA 14Ø592Ø3Ø28DØ51Ø13ØF 8
    E1Ø12ØF1712Ø914Ø592 88ØØ18Ø
    D8A3F2Ø8Ø5721        :REM*239
237 DATA 2F2Ø8ØA9213B2Ø8Ø7221 4
    52ØØØ7A37512ØØØ7737 5B2Ø8Ø1
    B216Ø2ØØØ3437        :REM*93
238 DATA 642Ø8Ø9A216A2ØØØ728 7
    12ØØØ2128ØØØ5ØØF87 FØ1EØØB
    F2EØ222ØØ9E2E        :REM*124
239 DATA BC2ØØ4E2EB41CØØ6B39 B
    91CØØ5539BF1CØØ4939 C52Ø8Ø4
    32198ØØ9ØØF83        :REM*192
24Ø DATA D32ØØØ8939D62ØØØ8F39 D
    B2ØØØ83399ØØØ281283 B22Ø8Ø6
    B21B72ØØØ3F39        :REM*1Ø3
241 DATA A31CØØ713998Ø038Ø7DØ 3
    6399ØØØ38ØC87862ØØØ 47378A2
    ØØØ4A379Ø2ØØØ        :REM*154
242 DATA 4D37952ØØØ5B37982ØØØ 5
    F379E2ØØØ6337A72ØØØ 6F379ØØ
    Ø6ØØ982792ØØØ        :REM*59
243 DATA A4158 12ØØØAA159ØØØ3Ø Ø
    7DØDØ37ØCØF01841 3Ø1 1685Ø3Ø
    FØDØDØ1Ø8413         :REM*242
244 DATA Ø514ØØØ4Ø516Ø9Ø385BØ Ø
    Ø18ØB84BØ218Ø4422B4 218Ø762
    2B821ØØBC29BF        :REM*232
245 DATA 218ØEF211BØØØ5Ø9Ø7Ø8 9
    4ØØØØØE09ØE85B8Ø04Ø Ø982E22
    1ØØA429E921ØØ        :REM*199
246 DATA AA29Ø6ØFØE941ØØ1Ø785 1
    3Ø8Ø11Ø851ØØ1141405 12ØE93Ø
    21215 13Ø8Ø593       :REM*91
247 DATA ØDØFØEØFØ3Ø812ØFØD85 Ø
    8Ø912Ø513Ø013Ø312Ø5 Ø58EØDØ
    5Ø412Ø513ØØ13        :REM*231
248 DATA Ø312Ø5Ø58E1514Ø9ØCØ9 1
    499B8ØØ28ØE89FE21ØØ 4Ø2AØ22
    2ØØ492AØ622ØØ        :REM*3
249 DATA 462AØB22ØØ432A1322ØØ 4
    C2A1A22ØØ372A2422ØØ 3D2A3Ø2
    2Ø3A2A3D22ØØ         :REM*177
25Ø DATA 3Ø2AB8Ø3ØØE88FE21ØØ 7
    B2BØ222ØØA22BØ622ØØ 9F2BØB2
    2ØØ932B1322ØØ        :REM*47
251 DATA 6E2B1A22ØØAA2B2422ØØ A
    72B3Ø22ØØAD2B1ØØ58E Ø412Ø19
    714191Ø85ØDØF        :REM*68
252 DATA Ø485Ø4Ø9138B9D9CA6A7 Ø
    ØØØØ25ØAA3228ØBC1D Ø6228Ø6
    C1EA6228ØØ61F        :REM*231
253 DATA AA228ØC61FAE228ØE42Ø B
    2228ØC921B622Ø03A26 B722ØØF
    525B822Ø02226        :REM*199
254 DATA B922Ø04826ØØØØØØØØØ Ø
    ØØØØØØ3F033F333FØØ ØØ3Ø3Ø3
    F33333FØØØØØØ        :REM*126
255 DATA 3F3Ø3Ø3Ø3FØØØØØ3Ø33F 3
    3333FØØØØØ3F333F3Ø 3FØØØØØ
    FØC3FØCØCØCØØ        :REM*163
256 DATA ØØØØ3F33333F033FØØ3Ø 3
    Ø3F333333ØØØØØCØØØC ØCØCØCØ
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    ØØØØ3ØØØ3Ø3Ø3      :REM*251
257 DATA Ø33FØØ3Ø3Ø333C3333ØØ Ø
    ØØCØCØCØCØCØCØØØØØØ 333F3F3
    333ØØØØØØ3F33      :REM*72
258 DATA 333333ØØØØØØ3F333333 3
    FØØØØØØ3F33333F3Ø3Ø ØØØØ3F3
    3333FØ3Ø3ØØØØ      :REM*21Ø
259 DATA 3F333Ø3Ø3ØØØØØØØ3F3Ø 3
    FØ33FØØØØØC3FØCØCØC ØFØØØØØ
    Ø333333333FØØ      :REM*68
26Ø DATA ØØØØ33333333ØCØØØØØØ 3
    333333F33ØØØØØØ333F ØC3F33Ø
    ØØØØØ3333333F      :REM*38
261 DATA Ø33CØØØØ3FØ3ØC3Ø3FØØ Ø
    ØØØ33ØC3FØC33ØØØØØC 3F3FØCØ
    CØCØCØØØC3ØFF      :REM*19
262 DATA FF3ØØCØØØØØØØ3F3Ø3Ø 3
    F3Ø3ØØØØØFFØØØØFFØØ ØØØØØØF
    CØCØCFCØCØC3Ø      :REM*29
263 DATA 3Ø3Ø3F3FØØØØØØØØØØØØ F
    FFFØØØØØØØCØCØCFCFC ØØØØØØ3
    Ø3Ø3Ø3Ø3Ø3Ø3Ø      :REM*241
264 DATA 3ØØCØCØCØCØCØCØCØCØØ Ø
    CØCØCØC3F3FØC3ØØCFF FFØC3ØØ
    ØØØØØØØØCCØØ      :REM*88
265 DATA ØØØØØØØØØØØFØØØØØØØ Ø
    ØØØØØØØFFØØØØØØØØØ ØØØØFFØ
    ØØØØØØØØØØØØ      :REM*46
266 DATA AAØØØØØØØØFFØØØØFØØØ Ø
    ØCCØØØØC3ØØØØCØØØØØ FØØØØØC
    CØØØØC3ØØØØFF      :REM*6Ø
267 DATA ØØØØC3ØØØØC3ØØØØC3ØØ Ø
    ØC3ØØØØC3ØØØØC3ØØØØ FFØØØØØ
    ØØØØØ2819ØØØØ      :REM*5
268 DATA ØØ28ØACD8FAØ22C97ØE0 B
    E2D8ØØØ132Ø614ØAFA9 ØØ8D99Ø
    C2ØCC175BØØFA      :REM*177
269 DATA ØØ5ØØE6FDE6FDE6FEE6 F
    ED025A9ØØ2CA98Ø8D99 ØC2ØCC1
    78E24FAØØØ5ØØ      :REM*237
27Ø DATA 4CEØ24A9ØØ2CA98Ø8D99 Ø
    C2ØCC178924FAØØØ5ØØ 2Ø58261
    8651F8D97ØCA5      :REM*2Ø7
271 DATA FC4A4A4A18652Ø8D98ØC A
    ØFA2Ø5817AØFA2Ø7E17 2Ø4A25A
    5FDØAØAØA8543      :REM*72
272 DATA A9ØØ2A85442Ø7252Ø95 2
    52Ø7252Ø9525A9DØA2 Ø72Ø494
    7A54229Ø3Ø9D8      :REM*86
273 DATA 85422Ø725A94Ø186552 8
    552A9Ø165538553A928 18654C8
    54C9ØØ2E64DEE      :REM*2Ø2
274 DATA 98ØCC6FEDØB4AD97Ø2Ø Ø
    619853F864ØAD98ØCA2 FE38E91
    9E8E8BØFA6919      :REM*212
275 DATA 8D9BØC8E9AØCØAØAA2AØ 2
    ØØ8192Ø4947AC9AØCB9 9424AAB
    993242Ø4947A5      :REM*142
276 DATA 528541A5538542A93F85 4
    7AE9AØCFØØ2A97F8546 6ØAE9AØ
    CBD9B24186D97      :REM*218
277 DATA ØC853FBD9C2469ØØ854Ø A
    25ØAD9BØC2ØØ8192Ø49 47A54C8
    541A54D8542A5      :REM*6Ø
278 DATA FD8543A9ØØ8544A9ØED0 C
    22C99ØC1ØØFA23FAØ41 2ØDE25A
    546A647854786      :REM*2Ø1
279 DATA 464CE517A9Ø18531B5ØØ 4
    8B9ØØØØ95ØØ6899ØØØØ E8C8C63
    11ØEE6ØA52C1Ø      :REM*2
28Ø DATA 22A52Ø38E9Ø1BØØ2A9ØØ 2
    ØØ7269ØEE852Ø2C851F 2ØCF24A
    5133ØØ6C9ØDFØ      :REM*1
281 DATA Ø2186Ø6868A9ØØ85674C 2
    B1BA52C1ØF5A9Ø12Ø3Ø 262ØØ72
    69ØF218652ØC9      :REM*1Ø6
282 DATA 4A9ØØ2A94A6ØA51F38E9 Ø
    1BØØ2A9ØØ2ØØA269ØF2 A51F186
    9Ø1C9289ØØ2A9      :REM*66
283 DATA 282ØØA269ØFØA2FAB5Ø1 4
    AB5ØØ6A4A4A6ØAAAØØ3 BD2Ø2E9
    91515CA881ØF6      :REM*3Ø
284 DATA 6ØAØØØAEDC14A97F4C4E 1
    44A4AØA48A8B9EE2DAA B9EF2DA
    8686Ø2Ø23272Ø      :REM*111
285 DATA BF183Ø042ØØØ2ØA2Ø1AØ Ø
    82Ø8914A259AØØC863F 844ØAØØ
    ØB13FFØØ62Ø45      :REM*133
286 DATA 14C8DØF66ØA9ØC482Ø85 1
    468A2F5AØ2C85312ØAØ 268543A
    2ØEAØ272ØAØ26      :REM*213
287 DATA 2ØCF12BØ3Ø2ØØ114C9ØØ F
    ØF4A443C914FØ17C9ØD FØ1F2Ø1
    327BØE5C431BØ      :REM*8
288 DATA E1993ØØC2Ø4514E643DØ D
    ØCØØØFØD32Ø4514C643 4CCA26A
    4438C2FØCA9ØØ      :REM*166
289 DATA 993ØØCAE3ØØC986Ø122Ø 9
    29DØØC92Ø9ØØAC9AØBØ Ø4C98ØB
    ØØ2186Ø386ØAE      :REM*218
29Ø DATA DC142Ø9C14BØ342Ø4429 B
    Ø2FAØØØ2ØØ1149959ØC C8C9ØDD
    ØF52Ø2914A9ØØ      :REM*42
291 DATA 9959ØCAD59ØC29ØF8531 Ø
    AØA6531ØA8531AD5AØC 29ØF653
    1C9149ØØ96Ø2Ø      :REM*232
292 DATA 2914A9ØØ8D59ØC186Ø2C 5
    32C57ØØ2C5Ø2C57ØØA2 ØØ2CA2Ø
    5AC2FØCBD6927      :REM*231
293 DATA FØØ7993ØØCC8E8DØF46Ø 2
    Ø6E14BØ3D2Ø4429BØ38 6ØA9ØØ2
    ØA514BØ3Ø6Ø2Ø      :REM*13Ø
294 DATA AE14BØ2A6ØA27F2Ø9C14 B
    Ø222Ø4429BØ1D6ØAEDC 142CA27
    F2Ø9314BØ112Ø      :REM*255
295 DATA 4429BØØC6Ø2Ø4514BØØ6 2
    Ø4429BØØ16ØC9Ø3FØØ4 C9Ø5DØØ
    3A9ØØ2CA98Ø48      :REM*154
296 DATA 2Ø3214681ØØ82Ø2327Ø2 8
    D26FØØ92ØCC173F2D3Ø Ø412ØØ2
    ØC9122Ø32142Ø      :REM*22Ø
297 DATA CF24AD2B8Ø852Ø2843B 2
    Ø6D1324293Ø1A2Ø8913 A9ØØA21
    B8D712Ø8E6A2Ø      :REM*15Ø
298 DATA ADA1ØC8525ADA2ØC8526 4
    C2B1B2ØAA13A2ØØA91B DØE42Ø6
    326A92A8D1915      :REM*236
299 DATA A9248D12152Ø7126A9Ø8 A
    212AØ152Ø57142Ø1D29 2Ø88272
    ØA1279ØØ34CCA      :REM*96
3ØØ DATA 272Ø3A29BØF87Ø662Ø37 2
    92Ø2629A9ØØ8D86ØC18 6978854
    1A9Ø469ØØ8542      :REM*56
3Ø1 DATA A9ØØ8D85ØC2Ø3729BØD6 7
    Ø44A9222Ø28297Ø3D2Ø 3729AØØ
    Ø2Ø3D29BØC37Ø      :REM*112
3Ø2 DATA 31C922FØØ82Ø43179141 C
    8DØED2Ø2629EE85ØCAD 85ØCC91
    69ØØBAD86ØCC9      :REM*21Ø
3Ø3 DATA 1CBØ1169ØE9ØAFA54118 6
    92885419ØB9E642DØB5 2Ø3214Ø
    Ø8A262ØC912A5      :REM*246
3Ø4 DATA 11C9189Ø574A4A4AA228 2
    ØØ819853F864ØA9ØØA2 Ø42Ø494
    7A4ØFA51ØA27Ø      :REM*94
3Ø5 DATA 2Ø3219A2ØE2ØØ8192Ø49 4
    7AØØE883Ø2EB13FC92Ø FØF7984
    8B13F2Ø341799      :REM*86
3Ø6 DATA 1915881ØF568A8C898FØ 1
    51869Ø68D2915A213AØ 152Ø571
    418A9ØØA2Ø04C      :REM*1Ø3
3Ø7 DATA 7714386ØA9ØØ8531Ø3D 2
    9BØØ77Ø05C531DØF518 6Ø2Ø3A2
    92Ø3D292ØØ114      :REM*1Ø9
3Ø8 DATA B89Ø16Ø48249ØA59ØC9 8
    Ø9ØØ468A9Ø56Ø686ØA9 538D121
    5AC2915A9ØØ99      :REM*95
3Ø9 DATA 14152ØAE27A212AØ152Ø A
    Ø262Ø43144C2914A938 2Ø9B272
    Ø23279Ø25C93F      :REM*1Ø9
31Ø DATA FØØ62ØE1274CF2272Ø4Ø 1
    4A217AØ2DA9Ø12ØBC26 E059DØE
    D2Ø32142Ø5329      :REM*81
311 DATA 2Ø8A26386Ø2Ø8D26186Ø A
    91BA2Ø8DØØ4A9ØØA2Ø9 8EDC148
    DE221491B8DE9      :REM*1Ø4
312 DATA 214C2B1BA9Ø4A2ØE2ØE4 2
    92Ø8514A2Ø7AØ2DA928 2ØBC26F
    ØØA2ØAE27A23Ø      :REM*1Ø4
313 DATA AØØC2Ø67294CDE274A4A A
    8B9E32D8E82ØC482ØØ7 132ØØE4
    EA98Ø8DØØØCAE      :REM*1Ø1
314 DATA 82ØCBD512DFØØ62Ø4514 E
    8DØF568AABD7F2DFØØ6 2Ø4514E
    8DØF52ØB518ØØ      :REM*248
315 DATA D8E8Ø3ØD2ØBF185ØØ428 Ø
    Ø4Ø2ØCC17382D28Ø4Ø7 ØØCE81Ø
    C2Ø8D3B4C3333      :REM*41
316 DATA A92348A224DØ1AA9172C A
    91F2CA91B2CA9Ø32CA9 Ø72CA9Ø
    F2CA9132CA9ØB      :REM*2Ø5
317 DATA 48A2ØØ2ØDE296848Ø2A 2
    8BØ392Ø712668484A4A ØAA8B9Ø
    E2EAAB9ØF2EA8      :REM*17
318 DATA CØ4EDØØ34CØ82B6848C9 1
    FFØ1E2Ø93272Ø752968 C923FØ5
    EC917FØ36C91B      :REM*178
319 DATA FØ35C913FØ3AC9ØFFØ54 4
    CF22786388439Ø8827 2Ø75292
    ØA1272ØA62C2Ø      :REM*86
32Ø DATA DØ3A2Ø3D29482Ø32142Ø 7
    C13688D21DØ8DØØØC4C 1Ø422Ø9
    5182Ø3214Ø6D      :REM*176
321 DATA 134C1Ø42242C1ØC6A9Ø1 2
    Ø1F292Ø7126A931A2ØØ AØ132Ø6
    52B4CF2272ØØØ      :REM*5
322 DATA 6C4CF2272ØCC17ØØ6ØØØ D
    Ø471F2ØBF1847EFDØØ7 ØØ2Ø712
    6A958A247AØEF      :REM*181
323 DATA 2Ø652B4CF2272Ø932272Ø 7
    529AØØ7B9EC2CD9F64E DØØ5881
    ØF53Ø162ØCC17      :REM*31
324 DATA F64EØØ6Ø8ØØC2ØCC17ØØ 6
    ØFF4E8ØØCA2Ø7DØØ3AE FE4E8EC
    114E8EØØ8FØØ2      :REM*111
325 DATA A22Ø8EC414AØØ6B91315 2
    Ø4317C91B9ØØ2A9ØØ99 A81FC8C ►
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    C29159ØEBB9A7        :REM*2Ø
326 DATA 1FØ98Ø99A71F4CF2278D 1
    7152Ø93274C75292ØCC 1717F7Ø
    Ø6ØF4Ø2A9ØBDØ        :REM*143
327 DATA 39ADC114DØØ34C2B1B8D F
    42C2ØCC17EC2CF64EØ9 ØØA9Ø3D
    Ø212ØCC17ØBFA        :REM*27
328 DATA ØØ6Ø8Ø04A9Ø72CA9ØF2C A
    9134CB42BA91B2CA917 2CA91F4
    82ØCF246848A2        :REM*184
329 DATA Ø72ØDE2968482Ø632620 B
    126FØ56AC2FØC6848C9 1FDØØ32
    Ø76272ØØC292Ø        :REM*62
33Ø DATA CC173ØØC19151ØØØ2Ø71 2
    66848C91FDØØ5AØØ22Ø 7326684
    82Ø7B26863884        :REM*99
331 DATA 3918691Ø2Ø7E26CØØØFØ 5
    BCØØ1FØ1CC05BDØØBAD C114C9Ø
    7DØØ4A2FFAØ56        :REM*66
332 DATA 2Ø7Ø29BØC768C913FØ1D 4
    CF2272Ø88272Ø7529BØ B72ØCF2
    42ØB2272ØA62C        :REM*142
333 DATA AD2C8Ø2ØBF274CF227A2 3
    12Ø972CA2318E1715A9 Ø12Ø1F2
    9A9ØØ8538A913        :REM*33
334 DATA 8539A26ØAØFD2Ø7Ø294C F
    2272ØCC17ØØDØØØ6Ø47 1FAE056
    ØE8ACØ26ØC898        :REM*222
335 DATA 2ØØ8191869Ø7488A696Ø A
    868AA2Ø7Ø29A2589ØØ6 2Ø972C4
    CDC2B8E17152Ø        :REM*98
336 DATA CC1747EFØØ6ØDØØ7A2DØ A
    Ø674C1Ø2CAD1715488E 1715205
    329688D17156Ø        :REM*118
337 DATA A942A21F2ØCØ2CA9ØØA2 5
    C2ØB82CA9ØØA2D88538 8639A9E
    8A2Ø385438644        :REM*13Ø
338 DATA AØØØC443DØØ5C6441ØØ1 6
    ØAD82ØCDØØB2Ø3D29BØ F591387
    ØF19ØØ5B1382Ø        :REM*173
339 DATA BF27C8DØDFE639DØDB6Ø 5
    25Ø462Ø522E522EØØ45 4E54455
    22Ø46494C454E        :REM*132
34Ø DATA 414D452Ø3F2ØØØ444953 4
    B2Ø434F4D4D414E442Ø 3F2ØØØ4
    6494C452Ø4558        :REM*129
341 DATA 495354532E2Ø52455Ø4C 4
    143452Ø49542Ø28592F 4E292Ø3
    F2ØØØ53544154        :REM*231
342 DATA 55533A44455649434520 4
    E4F542Ø5Ø524553454E 544C4F4
    1443A2ØØØ5341        :REM*29
343 DATA 56453A2ØØØ4449534B2Ø 4
    34F4D4D414E443AØØ5Ø 52494E5
    43A2ØØØ455845        :REM*27
344 DATA 435554453A2ØØØ464F4E 5
    4ØØ5Ø415454455524EØØ 4252555
    348Ø053484150        :REM*168
345 DATA 45ØØ5Ø414745ØØ4D4F4E 4
    F4348524F4D452Ø5343 5245454
    EØØ4849524553        :REM*1ØØ
346 DATA 2Ø53435245454EØØ4D45 4
    4524553205343524545 4EØØ555
    4494C49545ØØ        :REM*38
347 DATA 52454354414E474C45ØØ 5
    3435245454EØØØØØ5ØD 13191E3
    Ø3D4B535DF64E        :REM*172
348 DATA ØØ6ØØØ6ØØØ6Ø2B8ØØØ6Ø Ø
    Ø5CFE5F7F5B8Ø64F462 ØØØØ4DC
    E4Ø7F4Ø7FØØØ1        :REM*146
349 DATA F64EØBFA17F7ØØ6Ø2B8Ø Ø
    Ø6ØØØ5CFE5FØØ6C525Ø 462E525
    Ø5Ø2E525Ø422E        :REM*2Ø9
35Ø DATA 525Ø532E525Ø3Ø2E525Ø 4
    F2E525Ø482E525Ø4D2E 525Ø552
    E2Ø2Ø2Ø2Ø284         :REM*91
351 DATA 3B4C2B1B2C4F2F3ØF82Ø F
    92FA927482Ø62422Ø76 43C9ØØF
    ØE5482C4F2F5Ø        :REM*12
352 DATA ØCØAØAØA8D8Ø2FA9ØØ2A 8
    D812F984A4A4AFØCD48 2Ø843BA
    25D2Ø5A261865        :REM*174
353 DATA 2Ø8D98ØCA65BA55C2Ø76 4
    318651FAA68A86838E9 Ø14CD32
    EA91348AØ1924        :REM*245
354 DATA 2C1ØØ2AØ632Ø2C92FBØØ8 6
    52ØDØØ34C2B1BA8A94F A2ØØ8E9
    8ØCFØ14A91748        :REM*175
355 DATA A9192Ø2C92FA8FØE8A52Ø 8
    D98ØCA927A61F8CØ3ØC 8E97ØCC
    D4E2F9ØØ3AD4E        :REM*57
356 DATA 2F8DØ2Ø2C68A21C2ØDE29 A
    9ØØ85232Ø1D29A9ØØ2Ø 5714208
    62F2ØB227A252        :REM*212
357 DATA AØ2FAD512F2Ø3Ø2F2ØCC 3
    4A9Ø88DØ1ØC2Ø4A25A9 8Ø8543A
    9Ø285442ØDC17        :REM*127
358 DATA 2Ø452FEE98ØCCEØ3ØCDØ E
    72Ø482F2Ø32144CF227 863F844
    Ø8543FØØCAØØØ        :REM*251
359 DATA B13F2ØBF27C8C4439ØF6 6
    Ø4C853Ø4C6A31Ø7ØØØØ 3CØ7ØØØ
    Ø4841524D4F44        :REM*187
36Ø DATA 45ØØ1ØØ2ØBØCØ1Ø8FF46 4
    F4E545349Ø1Ø8ØØ1ØØ2 ØCØCAEØ
    ØØ1ØF48415253        :REM*125
361 DATA 495A45ØØ13Ø2ØDØ1Ø8Ø2 F
    F464F4E5441AECØ14EØ Ø4FØ33A
    91Ø2ØB326DØØ3        :REM*81
362 DATA 4CF2272Ø732720CC173Ø Ø
    C151514ØØAC2FØC2ØØC 29AECØ1
    4AØØ22Ø7626AD        :REM*2ØØ
363 DATA 29152Ø12292Ø88272Ø75 2
    9BØEA6ØAC4B2F2Ø7626 4C88273
    82C15ØC1Ø292Ø        :REM*132
364 DATA F92F2Ø253ABØFB2Ø153B 2
    ØCF3B2Ø183CA9Ø32Ø55 422Ø183
    C2ØCF129ØE5A5        :REM*227
365 DATA 4A482Ø843B684A4A4A18 6
    Ø2Ø2A2AA98Ø85234CCF 244CFA3
    14C1F32Ø5ØØØØ        :REM*198
366 DATA 5Ø8ØØØØ41B543136Ø4CD Ø
    1FF4415441Ø61B533Ø 3323Ø1
    4Ø2Ø61B533Ø36        :REM*2Ø1
367 DATA 343Ø5441Ø21B41444550 5
    448Ø014Ø218ØC4CØ1FF 4441544
    142494C853Ø4C        :REM*191
368 DATA 6A31Ø7ØØØØ3CØ7ØØØØFF 4
    252555348444952464C 41Ø1Ø81
    4Ø21AØCC1Ø1FF        :REM*111
369 DATA Ø1Ø84954524947485401 Ø
    F52ØØ15Ø21BØCBBØ1FF 4544Ø1Ø
    8424F54544F4D        :REM*81
37Ø DATA 422Ø7C312Ø2B3198AAAØ Ø
    ØE0Ø7BØØ9B13F9DØØ6A C8E8DØF
    384312Ø0F4302Ø        :REM*154
371 DATA E23ØC6441ØE02ØCC17ØØ 6
    ØØØ648Ø02A5318DØ1ØC C9Ø2BØØ
    B2ØC53Ø2Ø3F31        :REM*14
372 DATA A9Ø88DØ1ØCADØ2ØCCD4E 2
    F9ØØ52C4D2F3ØØFA9ØD 2ØBF272
    C4C2F1ØØ5A9ØA        :REM*9
373 DATA 4CBF276ØA53F1869Ø885 3
    F8D35319ØØ5E64ØEE36 316ØAØØ
    7A2Ø62ØØ431Ø9        :REM*179
374 DATA 8Ø2ØBF27881ØF3608A48 1
    EØØ6A2C5Ø2F1ØØ46A4C 13312AC
    A1ØFØAA68C9Ø7        :REM*16Ø
375 DATA 8ABØØ62C5Ø2F1ØØ14A2C 1
    3ØC1ØØ249FF6ØAEØ1ØC AØØØEØØ
    8BØØABDØØ6499        :REM*244
376 DATA ØØ6AC8E8DØF26Ø2Ø7C31 A
    DØ1ØCC9Ø89ØØ16Ø2Ø2B 31A9ØØ2
    C13ØC1ØØ2A9FF        :REM*12Ø
377 DATA 99ØØ6AC8CØØ79ØF82ØF4 3
    Ø2ØE23ØC6441ØE2186Ø 2Ø3F31B
    ØØ32ØC53ØA271        :REM*187
378 DATA AØ2FAD7Ø2F4C3Ø2FADØ2 Ø
    C8544CD4E2FBØØEC927 FØ14A27
    EAØ2FAD7D2F4C        :REM*6Ø
379 DATA A531A268AØ2FAD672F4C A
    531A25FAØ2FAD5E2F2Ø 3Ø2FA9Ø
    Ø853F8D3531A9        :REM*94
38Ø DATA 6Ø854ØA9648D36316Ø4C F
    A314C1F325Ø5ØØØ5Ø4Ø 8ØØ31B3
    3174B45525242        :REM*97
381 DATA 5546ØØ12Ø41B4B4ØØ1FF 4
    94F4DØ41B4B8ØØ24147 ØØ14Ø21
    B3254Ø3FF4C4F        :REM*187
382 DATA 4144534156Ø41B4B8ØØ2 Ø
    Ø1ØØ2832Ø7C31AØØ7B1 3F99ØØ6
    A881ØF8C8A2Ø7        :REM*17Ø
383 DATA 2ØØ4312ØBF27C8CØØ89Ø F
    32ØE23ØC6441ØE14CC5 3ØA271A
    Ø2FAD7Ø2F4C3Ø        :REM*91
384 DATA 2FA94Ø8D9FØCA98ØØD9F Ø
    C8D9FØC2Ø9D3BA2ØØ86 6486662
    ØDØ32A2Ø22ØDØ        :REM*157
385 DATA 32A56938E567A56AE568 Ø
    8A2Ø2BØØ2A2ØØB56749 FF856DB
    56849FF856E86        :REM*254
386 DATA 71A2692ØF43228BØØ3A2 6
    72CA269B5Ø16A856CB5 ØØ6A856
    B9ØØAA46C1ØØ6        :REM*82
387 DATA E66BDØØ2E66C2Ø4433E6 6
    DDØØAE66EDØØ6A9ØØ8D 9FØC6ØA
    6712ØB132246C        :REM*128
388 DATA 3Ø03A2Ø02CA2Ø2E471FØ D
    D2ØB1324C8832B56318 7548954
    8B56475499549        :REM*4
389 DATA 8A49Ø2AAA56B18756785 6
    BA56C7568856C6ØAØØ1 9463B55
    F38F5489567B5        :REM*45
39Ø DATA 6ØF5499568Ø3Ø71567DØ Ø
    295636ØAØFF94649463 8A6967A
    AA9ØØ38F5ØØ95        :REM*168
391 DATA ØØA9ØØF5Ø195Ø16ØA2ØØ 2
    CA2Ø2B52538F5489548 B526F54
    995496ØA9Ø118        :REM*18
392 DATA 654885489ØØ2E6496ØA9 F
    F2CA9FE1865488548BØ Ø2C6496
    ØAØ1F2CAØØ72C        :REM*1Ø3
393 DATA AØØ3A2Ø3B54899DF1488 C
    A1ØF76Ø2C9FØC7Ø3DA9 ØE2C9DØ
    CFØ362Ø3333A9        :REM*129
394 DATA Ø22C9DØCFØØ92ØØ2332Ø 8
    6332ØBF36A9Ø42C9DØC FØØ92ØØ
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    5332Ø86332ØBF          :REM*5
395 DATA 36A9Ø82C9DØCFØØC2ØØ2 3
    32ØØ5332Ø86332ØBF36 2ØB3349
    ØØ16ØA92Ø2C9F          :REM*91
396 DATA ØCDØ1B3Ø132CD8141Ø11 2
    CAØØC1ØØ92Ø15332ØC2 332Ø213
    34CC8334CØB3E          :REM*225
397 DATA 2Ø37441ØØ16Ø8532ØAØA Ø
    AØA85332ØCF344CE933 2ØB3349
    ØØ16Ø2ØCF34AD          :REM*253
398 DATA D5148532ADD71485332C 9
    FØC3Ø48242A5ØØBEE9E ØCAD9EØ
    C2DD414FØ3CAØ          :REM*171
399 DATA ØØAD2C8Ø24293ØØ4B14C 2
    9ØF8531C532FØ297Ø24 2C1DØC3
    Ø1FB14C29ØFC5          :REM*156
4ØØ DATA 32FØ14AAB14E29ØFC532 F
    ØØ8E431FØØ7C531DØØ6 A2Ø32CA
    2Ø22CA2Ø12CA2          :REM*229
4Ø1 DATA ØØA52A29FC852A8AØ52A 8
    52A8AA8A65Ø24297ØØD B97Ø353
    D6C358551BD6C          :REM*113
4Ø2 DATA 35DØØBB96Ø353D643585 5
    1BD6435AØØØ2C9FØC1Ø Ø7A5515
    1529152649FF           :REM*63
4Ø3 DATA 3152Ø5519152AD1DØC3Ø 3
    2A52A3Ø2E29Ø324297Ø 1C29Ø3A
    AFØ23EØØ3BØ1B          :REM*188
4Ø4 DATA B14CEØØ2FØØ629ØFØ533 5
    ØØ429FØØ532914C6ØC9 Ø1DØØ8A
    AB85ØE5A53291          :REM*88
4Ø5 DATA 4E6Ø29Ø3FØFBAAEØØ1DØ F
    6B14C29ØF1DØC15914C 6ØA54AA
    44B2Ø3C45BØØF          :REM*128
4Ø6 DATA A548A4494C2B452ØBF18 4
    8ØØØ4ØØØØ6Ø2ØC334A5 482DA3Ø
    C8552Ø24291ØØ5         :REM*136
4Ø7 DATA Ø648264ØØ82Ø5617A54A 2
    9Ø718655285529ØØ2E6 532Ø7C1
    724291ØØ52866          :REM*184
4Ø8 DATA 4966486ØØØ6Ø4Ø618Ø62 C
    Ø63ØØ654Ø668Ø67CØ68 ØØ6A4Ø6
    B8Ø6CCØ6DØØ6F          :REM*7
4Ø9 DATA 4Ø7Ø8Ø71CØ72ØØ744Ø75 8
    Ø76CØ77ØØ794Ø7A8Ø7B CØ7CØØ7
    EØØ5C285C5Ø5C          :REM*155
41Ø DATA 785CAØ5CC85CFØ5C185D 4
    Ø5D685D9Ø5DB85DEØ5D Ø85E3Ø5
    E585E8Ø5EA85E          :REM*158
411 DATA DØ5EF85E2Ø5F485F7Ø5F 9
    85FCØ5FØØFFØØØØ8Ø4Ø 2Ø1ØØ8Ø
    4Ø2Ø1CØ3ØØCØ3          :REM*97
412 DATA ØØ55AAFF2Ø7Ø3B2ØB439 2
    Ø5D42A56148A55D8561 2Ø9D3B2
    Ø2D376848C55D          :REM*114
413 DATA FØ12E65DDØØ2E65E2Ø9D 3
    BA54AA64B2Ø99363ØE8 68855D8
    5612Ø9D3B2Ø2D          :REM*142
414 DATA 37FØCB2Ø7Ø3B2ØB4392Ø 5
    D424A8A6A8D22ØC1865 5B855B9
    ØØ2E65C984A8D          :REM*51
415 DATA 23ØC18655D855D9ØØ2E6 5
    E2ØDB354CB535A9ØØ8D 24ØCAD2
    3ØC8D26ØCØA49          :REM*152
416 DATA FF69Ø38D28ØCA9FF69ØØ 8
    D29ØC2C14ØC3ØØ32Ø62 362C29Ø
    C1Ø222Ø223785          :REM*1Ø4
417 DATA 35C8DØØ2E6358434A2Ø1 2
    ØDØ362ØFF362Ø223722Ø FD36EE2
    4ØCA9Ø34C5536          :REM*232
418 DATA 2ØØE378534863589ØØ5 A
    2342ØF432A2ØØ2ØD036 289ØØ5A
    2342ØF432A534          :REM*224
419 DATA A6352ØFF362ØØE372ØFF 3
    62Ø6236CE26ØCA9Ø2A2 ØØ2ØFF3
    6AD26ØCC9FFDØ          :REM*36
42Ø DATA 946ØA55BA65C186D24ØC 8
    55F9Ø1E8866ØA55BA6 5C38ED2
    4ØC8548BØ1CA           :REM*63
421 DATA 8649A55DA65E186D26ØC 9
    ØØ1E82Ø9936A55DA65E 38ED26Ø
    CBØØ1CA854A85          :REM*54
422 DATA 61864B86622Ø36332C14 Ø
    C1ØØ52Ø2D37FØØE2Ø44 33A55F8
    548A56Ø8549 2Ø         :REM*91
423 DATA 4433AØØ32CAØØ72CAØ1F A
    2Ø3B9DF14954888CA1Ø F76ØA9Ø
    28543BD22ØC85          :REM*249
424 DATA 36A9ØØ85372Ø63198A49 Ø
    1AABD22ØC8536A9ØØ85 372Ø3C1
    98A49Ø1AAC643          :REM*2Ø1
425 DATA DØDCA534A6356ØAA9818 6
    D28ØC8D28ØC8A6D29ØC 8D29ØC6
    ØA2Ø22Ø243749          :REM*2Ø7
426 DATA FFAA9849FF1869Ø29ØØ1 E
    8EØ8Ø6ØA2ØØBD24ØCØA A8A9ØØ2
    A6ØA9ØØ852A4C          :REM*52
427 DATA 3932A91E2Ø55422ØCF12 9
    ØØ62ØEF186CFCFF4C2B 1BA2ØØ2 ►
```

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Circle 158 on Reader Service card.

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    CA2142CA22886          :REM*162
428 DATA 1FA52Ø852Ø2ØCF244C2B 1
    BA9ØØFØF4A94ADØFØA5 2Ø38E9Ø
    CBØØ2A9Ø04C53          :REM*128
429 DATA 37A9ØC2Ø3Ø264C533720 8
    Ø372Ø8D184C9Ø112Ø1D 3AAØØ82
    42C3Ø02AØØ2A2          :REM*9Ø
43Ø DATA Ø188B993249DAE37B99B 2
    49DB637CA1ØFØ843A2Ø C337AD2
    C8ØØDD7148DBA          :REM*138
431 DATA 372ØC618CD8F8Ø3EØØ2Ø C
    6182D8ØAØØFØØA43ADØ CC2Ø2Ø3
    A6ØA93FCØØØFØ          :REM*139
432 DATA Ø2A97F854685476ØAD21 D
    Ø29ØF8544CA8E21DØ24 2C3Ø188
    D62388E643820          :REM*8Ø
433 DATA CC175E3869ØØØ7ØØ2ØF1 3
    8Ø05CØØ5CE8Ø34C2B1B AØ5B2Ø7
    E17A9ØØ8531A9          :REM*21Ø
434 DATA 2818654C854C9Ø02E64D A
    ØØ3A2Ø2A531914CC8CA 1ØF8A91
    1186531853190          :REM*33
435 DATA EØA55BA45DC9Ø8FØØ8C9 4
    8DØØACØ38DØØ6AED514 4C4438C
    99ØFØØ16ØAD21          :REM*24Ø
436 DATA DØ29ØFAAE88AØAØAØA18 6
    55D854AA9Ø18537A924 A2ØØAØ1
    B2Ø8D194CEC19          :REM*231
437 DATA CØ8Ø8ØØFØØFØØØCØ8Ø8Ø F
    ØØØØFØØA54CA64D8DEA 388DEC3
    88EEB388EED38          :REM*224
438 DATA 6ØA9E8A2Ø38DEE388EEF 3
    86Ø2Ø1D3AA9AØA2ØF2Ø 8138AØØ
    8242C3Ø02AØØ2          :REM*126
439 DATA A2Ø188B99B249DEA389D E
    C38CA1ØF3843A2ØC337 AD21DØ2
    9ØFAAAD2C8Ø2Ø          :REM*175
44Ø DATA CB38AED714ADD6142ØCE 3
    8A43ADØD32Ø2Ø3A6ØAØ ØØ2CAØØ
    7488A48A2ØØB9          :REM*38
441 DATA 5E389569C8E8EØØ79ØF5 6
    8AA68856D866F2ØF138 2D8Ø2D8
    ØAØØF6ØAØØ6A2          :REM*61
442 DATA 442Ø4Ø18AØØØC443DØØ7 C
    6441ØØ34CEF182Ø1E18 24695ØØ
    B1ØØ2256CC56D          :REM*52
443 DATA DØ162Ø1E18246A1ØØ225 6
    E246B1ØØ2Ø56F5ØØ245 7Ø2Ø2F1
    8C8DØCDE64ØE6          :REM*41
444 DATA 42DØC74CEF1878CA8A2Ø 9
    715A98Ø2CA9ØØ788D12 ØC584C2
    B1BA232AØØ5DØ          :REM*32
445 DATA 26A248AØØ4DØ2ØA22CAC D
    C14A9Ø4CDCØ14FØØ2AØ Ø48CCØ1
    4CØØ44C7D39A2          :REM*76
446 DATA 27AØØ3DØØ4A216AØØ1A9 8
    Ø591ØØC991ØØC2Ø8Ø47 4C2B1BA
    ØØ3A23ØDØØAAØ          :REM*177
447 DATA 44A23ØDØØ4AØB9A2318C 9
    C398E9D392ØCC17443Ø 452F41Ø
    Ø4C2B1B2Ø7Ø3B          :REM*73
448 DATA 2ØD4392ØFD3A2ØFD394C A
    E392CD8143Ø1B2C14ØC 1Ø162ØB
    F1819ØD3FØØØØ          :REM*1Ø9
449 DATA A98Ø24291ØØ2A9CØ8D19 Ø
    D2Ø493FAD9CØC291FAC 971CDØØ
    2A9ØØ8D9DØCØ9          :REM*78
45Ø DATA Ø18D15DØAD11ØC85236Ø 2
    Ø7Ø3B2ØD4392ØFD3A2Ø FD394CF
    4392Ø253ABØFB          :REM*89
451 DATA 2Ø123B2Ø2E322Ø2E322Ø C
    93C2ØCF129ØEAAED414 CA8E9EØ
    C4C3632A98Ø2C          :REM*53
452 DATA A9ØØ85246ØA511C9C86Ø 2
    Ø5D3BA92ØDØ2Ø2Ø6C3B 2429ØØ
    34C2B1B2Ø3512          :REM*24
453 DATA A9ØØFØ1C2Ø7Ø3B2Ø3512 A
    94ØDØ122Ø7Ø3BA98Ø48 2ØD4392
    CD8143ØØ32Ø2D          :REM*52
454 DATA 12688DA8ØCA9ØØ8D9FØC 2
    ØØØ3B2Ø943B2ØC93C2Ø 253ABØF
    22Ø123B2Ø8C3A          :REM*166
455 DATA 24131ØEB3ØE62Ø153B2Ø 4
    433ADCD144C55422Ø2F 17A92Ø2
    CA8ØCDØEA1ØØ7          :REM*1
456 DATA A9ØØ852A4C36322Ø153B 2
    ØB334BØ132ØCF342CA8 ØC7ØØCA
    ØØØB14C29FØØD          :REM*181
457 DATA A9ØC914C6ØAØØ7A9ØØ91 5
    2881ØFBC8AD2C8Ø914E ØDD7149
    14C6Ø2ØCC34A9          :REM*198
458 DATA E88543A9Ø38544AØØ7A9 Ø
    Ø1152881ØFBC9ØØDØØ3 2ØC43A2
    Ø451A2Ø2E4CC6          :REM*48
459 DATA 43DØE6C6441ØE26ØAØ48 2
    CAØ5B2CAØ5F98482ØC9 3C68A82
    ØCF129ØF42CAØ          :REM*225
46Ø DATA 5B2CAØ5F2CAØ4878A6ØF A
    51Ø24291Ø064A488A6A AA6896Ø
    Ø99Ø1ØØA9ØØ99          :REM*85
461 DATA Ø3ØØA5119ØØ2ØØ586ØBD C
    Ø148DØBØCBDC3148DØC ØC8AØAA
    ABDC5148DØDØC          :REM*56
462 DATA BDC6148DØEØCDØ1C2ØD7 4
    74C7Ø3BØFØ5Ø2BD593B 8DCD14D
    ØØBCA8E1EØC4C          :REM*87
463 DATA 7Ø3BCA8EA9ØCAD371C18 6
    9Ø38D9D11AD381C69ØØ 8D9E114
    CCF242ØBF36A2          :REM*133
464 DATA 48AØØBDØ14A2ØBDØØEA2 4
    82CA25FAØ5BDØØ7A25F 2CA25BA
    Ø488EA73BA2ØØ          :REM*19Ø
465 DATA B5ØØ99ØØØØE8C8EØØ49Ø F
    56Ø2ØCF242ØEØ3BAØ25 2Ø173BA
    ØØ1A2ØØ162536          :REM*71
466 DATA 26E8E8881ØF74C9Ø1185 4
    AA9ØØ85488549ADA1ØC 855FADA
    2ØC856Ø62Ø25          :REM*1Ø6
467 DATA 3ABØFB2ØC33C2ØCF129Ø F
    36ØA9ØØ2CA98Ø788D96 ØC2Ø9D3
    BBØØAAØ542Ø17          :REM*94
468 DATA 3BA2542Ø9F3BA54A48A9 Ø
    Ø854AA9C785612Ø983C 682ØCD3
    BA9ØØ2CA98Ø85          :REM*28
469 DATA 4Ø2ØCF34A2ØØ2ØDØ32A2 F
    FA55Ø24291ØØB244Ø3Ø Ø2A255Ø
    AØ66726688632          :REM*57
47Ø DATA A8B9B8412532489849Ø7 A
    8C88431A56738E53185 67A568E
    9Ø0Ø234AA567          :REM*2Ø7
471 DATA 6A4A4AAA68A8A5324898 A
    ØØØFØØ26848244Ø1ØØ2 3152515
    2915220451ACA          :REM*193
472 DATA 1ØEEA55F2DA3ØC242910 Ø
    1ØAAA683DC141AØØØ24 4Ø1ØØ23
    1525152915218          :REM*2Ø3
473 DATA 586Ø2ØCF34A56138E54A 9
    ØF5AAE8A45ØB96C3529 5524293
    ØØ3B9643548AØ          :REM*32
474 DATA ØØ6848515291522ØØ43F C
    ADØF4686Ø2ØFC3B2ØØ1 3CA9ØE2
    C9DØCFØ35A225          :REM*2Ø1
475 DATA AØ2D2ØA13B24291ØØ4Ø6 2
    D262EA2ØFAØFA2ØA13B 2Ø4C3DA
    2Ø22ØØ63D2Ø4F          :REM*188
476 DATA 3DA2Ø62ØØ63DA2ØFAØFA 2
    ØA13B2Ø4F3DA2Ø42ØØ6 3D6ØA5F
    AC94ØA5FBE9Ø1          :REM*6Ø
477 DATA BØ29A5FCC9C8BØ231869 3
    29DØ1DØA5FA1869189D ØØDØA5F
    B69ØØØ88A4AAA          :REM*184
478 DATA BD483D28FØØDØD1ØDØ8D 1
    ØDØ6ØA9FA9DØ1DØ6Ø49 FF2D1ØD
    Ø8D1ØDØ6ØØ1Ø2          :REM*69
479 DATA Ø4Ø8A2ØØ2CA2Ø2B52D38 F
    5ØF95FAB52EF51Ø95FB 6Ø2Ø543
    B2ØFA3AA9ØØ85          :REM*114
48Ø DATA 2A8DAØØC2ØØ2458579CD D
    514FØEC2ØFD3DDØE7A4 4AA2ØØF
    Ø14A678FØDDCA          :REM*67
481 DATA BCØØØ4CABDØØØ48549CA B
    DØØØ48548867888844A E64A2ØF
    D3DFØF9C64A2Ø          :REM*49
482 DATA 15332ØCB3D2Ø24332ØCB 3
    D2Ø15332ØC233C64A2Ø FD3DDØC
    52Ø15332ØF13D          :REM*24
483 DATA 2Ø24332ØF13D4CAF3D2Ø F
    D3DDØ1FA678EØFC9Ø05 68684C6
    23DA5489DØØØ4          :REM*233
484 DATA E8A5499DØØØ4E8A54A9D Ø
    ØØ4E88678186ØE64A2Ø FD3DØ8C
    64A28DØCF6Ø2Ø          :REM*245
485 DATA B3349ØØ3A9FF6Ø2ØØ245 C
    5796ØA54A29ØF8531ØA ØA18653
    185772ØCF342Ø          :REM*77
486 DATA 3Ø33AECE14A9C838E54A C
    DCE14BØØ1AA867422Ø21 3F29078
    575ØAA8B92D3F          :REM*123
487 DATA 8D8E3E8D993EB92E3F8D 8
    F3E8D9A3EAØ17A93F38 E548AAA
    9Ø1E549DØØ6EØ          :REM*73
488 DATA 17BØØ28AA8981865754A 4
    A4A8576A9ØØ8D1CØCAD D714853
    3A54829ØFC9Ø8          :REM*18Ø
489 DATA 9ØØ2E677A5771869ØØ8D 9
    C3EA9Ø969ØØ8D9D3EAØ ØØA2ØØB
    DC9ØCFØ2849FF          :REM*251
49Ø DATA 31529152BDC9ØC3DØØØ5 1
    1529152AD1CØCDØ132C 1DØC3ØØ
    E98488A48A8A2          :REM*96
491 DATA Ø12Ø8Ø3468AA68A89818 6
    9Ø8A8E8E4769ØC9FØC7 AD8E3E1
    869Ø48D8E3E8D          :REM*62
492 DATA 993E9ØØ6EE8F3EEE9A3E 2
    ØØ43FAD1CØCDØØBA54C 1869288
    54C9Ø02E64DA5          :REM*239
493 DATA 77186905C95Ø9Ø02E95Ø 8
    577C674FØØ34C7A3E4C C236E65
    2DØØ2E653A552          :REM*98
494 DATA 29Ø78D1CØCDØØDA93818 6
    5528552A9Ø165538553 6ØA5482
    4291ØØ5ØA2649          :REM*6Ø
495 DATA 85486ØØØØ554Ø5A8Ø5FC Ø
    55ØØ6A4Ø6F8Ø64CØ7A9 ØØ182Ø9
    846A9ØØ182ØC7          :REM*191
496 DATA 462ØAB3F2ØBF18ØØØ5AØ Ø
    2ØØA9ØØ8D743F8D843F A9Ø58D7
```

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    53F8D853FA907        :REM*89
497 DATA 855ØA9ØØA9Ø38543A2Ø1 B
    919ØD9DØØØ5E8C8C643 DØF4984
    8A45ØA2Ø3183E        :REM*69
498 DATA ØØØ5CA1ØFA881ØF4AD74 3
    F1869Ø48D743F8D843F 9ØØ6EE7
    53FEE853F68A8        :REM*8Ø
499 DATA CØ3F9ØC4C65Ø1ØBE6ØA9 1
    68DCE14AØ3FCECE14DØ Ø4EECE1
    46ØA2Ø3A9ØØ88        :REM*231
5ØØ DATA 1919ØDCADØF9C9ØØFØE8 6
    ØAE487F24291ØØ5E88A ØAAACA8
    E1Ø15AD4A7F8D        :REM*44
5Ø1 DATA 1115A9Ø28DA6ØC8DA7ØC A
    24FAØ7FA9Ø886728473 857EA9C
    98578A9ØC8579        :REM*14Ø
5Ø2 DATA 2ØCF34A9ØØ857BAE1Ø15 E
    88AAEA6ØC2Ø2A19857A 267B29F
    FDØØ2C67BC67A        :REM*162
5Ø3 DATA AD1Ø154A4A4A857DAE11 1
    5E88AAEA7ØC2Ø2A1985 7C8574C
    67C2Ø213F29Ø7        :REM*19
5Ø4 DATA 857518657A48A9ØØ657B 4
    A686A4A4A8576A57A18 6548482
    9Ø78588A57B65        :REM*12
5Ø5 DATA 49AA68C94Ø8AE9Ø1BØØ9 A
    57C18654AC9C89ØØ16Ø AEA6ØCB
    DC941857F2Ø28        :REM*142
5Ø6 DATA 19858ØØAØAØAØAØA8581 A
    9ØØA47699F1ØC881ØFA A675BDC
    Ø418DF1ØCA688        :REM*55
5Ø7 DATA BDB941A47619F1ØC99F1 Ø
    CA9ØØA4769178AEA7ØC 2Ø28198
    582AØØØA2ØØA9        :REM*Ø
5Ø8 DATA CØ2481Ø8B17285838484 A
    48Ø848528Ø8FØ29A47F A9ØØØ68
    32A88DØFAA824        :REM*159
5Ø9 DATA 291ØØE28Ø83ØØ5B9DC41 7
    Ø11B9FØ415ØØC28Ø83Ø Ø5B9CC4
    17ØØ3B9EC419D        :REM*23Ø
51Ø DATA C9ØCE8E928BØØDC685DØ C
    BA484C8C47D9ØB6FØB4 68A57D2
    ØF441A475883Ø        :REM*244
511 DATA 13A2ØØ18Ø8287EC9ØCØ8 E
    8E4769ØF6FØF468BØEA A476A68
    8BDB941117891        :REM*223
512 DATA 783DB94151789178A95Ø 2
    47E08FØ1ØADF1ØCØDC9 ØC8DC9Ø
    CB9F1Ø117891         :REM*24
513 DATA 78287ØØBFØØ9B17849FF 9
    178881Ø7A918247E08 A552854
    1A5538542AØØØ        :REM*173
514 DATA A2ØØB14128Ø83Ø367Ø1E F
    ØØ33DF1ØC1DC9ØC9141 A541186
    9Ø88541ØØ2E6         :REM*23
515 DATA 42E8E4769ØDEFØDCBØ1C 2
    4291ØØCBDC9ØCØA1DC9 ØC31414
    C76413DC9ØC4C        :REM*28
516 DATA 76415DC9ØC4C7641682Ø Ø
    43FC674FØØ7C682DØA1 4C9D4Ø6
    ØFF7F3F1FØFØ7        :REM*178
517 DATA Ø3Ø1ØØ8ØCØEØFØF8FCFE F
    FØØØ4Ø2ØØØ3ØCØF3Ø33 3C3FCØC
    3CCCFFØF3FCFF        :REM*87
518 DATA ØØØ5ØAØF5Ø555A5FAØA5 A
    AAFFØF5FAFFØØØFFØFF ØØ55AAF
    F1869Ø1657285        :REM*244
519 DATA 729ØØFE6736ØA9Ø7C818 6
    5528552ØØ2E6536Ø2Ø CF242Ø9
    A422Ø3C424C9Ø        :REM*158
52Ø DATA 112ØCF242Ø9A422Ø3542 2
    ØDØ3A3ØEF2Ø7Ø3B2Ø5D 422Ø354
    22ØDØ3A3ØF52Ø        :REM*147
521 DATA 3F42A98Ø3ØØ52Ø3F42A9 Ø
    Ø854Ø2Ø9D3B2Ø1F3CE6 4AA54AC
    5619ØF5FØF3A9        :REM*156
522 DATA Ø61865A2C5A2DØFC6ØAD 1
    1ØC85232ØEØ3B2ØØF3B 2ØF13B2
    ØEØ3B2ØEE3B2Ø        :REM*9
523 DATA 123B2Ø6543BØØAA25BAØ 5
    F2ØDE2525Ø6543488A48 2Ø7Ø43B
    ØØAA25DAØ612Ø        :REM*213
524 DATA DE2527Ø43A868AA686Ø 2
    Ø5D42A9ØØA2DØAØØØ85 4186428
    43D2Ø6543BØØ2        :REM*199
525 DATA 3862Ø7A18AØØ1914188 8
    A9141C82Ø7Ø43C89141 853AE63
    A9ØE6A55B2DA3        :REM*212
526 DATA ØCC89141AAA55D29Ø7C8 9
    1418A18AØØØ7141AA98 C871412
    Ø76438545E645        :REM*1Ø3
527 DATA AØØ59141C8A5299141A9 Ø
    7186541854195ØØ2E642 2Ø9D3BA
    9478534A9EF85        :REM*2Ø6
528 DATA 35A92F8536A9F3853720 C
    F34AØØØA2ØØA1529141 2Ø451AC
    8C4459ØF49818        :REM*229
529 DATA 654185419ØØ2E642E64A C
    63ADØDD2ØEF18A53DDØ 282Ø9D3 ►
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```
    B2Ø8Ø43863A2Ø        :REM*82
53Ø DATA CF34AØØØA2ØØB14C8134 B
    14E8136A2342Ø3Ø4CC8 C4459ØE
    E2Ø591AC63ADØ        :REM*1Ø1
531 DATA EØ186ØA55F38E55BAAA5 6
    ØE55C6ØA56138E55D6Ø 4A8A6A4
    A24293ØØ14A6Ø        :REM*129
532 DATA 2Ø7A18ADØ4DØ186DØ2DØ 4
    A4A4AAA2ØEF18E86Ø2Ø EF184C9
    6432Ø7Ø3B2Ø7A        :REM*12Ø
533 DATA 18ADØ6DØC529DØEDAD11 Ø
    C8523ADØØDØAEØ1DØAC Ø2DØ2ØE
    F182Ø184B2Ø7A        :REM*178
534 DATA 18A55D8561ADØ2DØ2CD1 1
    43ØØ2A9ØØ8D2EØCAEØ2 DØE8864
    32Ø7A18ADØØDØ        :REM*1Ø4
535 DATA ACØ1DØ2CDØ143ØØ3A9ØØ A
    8186DØ3DØ8D2CØC9ØØ1 C88C2DØ
    CADØ4DØ186D2E        :REM*49
536 DATA ØC4A4A4A2ØØØ19854186 4
    2AD2EØC2ØØØ19853F86 4ØA9Ø7A
    2DØ2Ø4947A96Ø        :REM*89
537 DATA 8D9FØC2Ø3632E65DE661 A
    55DC9C8BØØEADD11418 6D2EØC8
    D2EØCC643DØAØ        :REM*79
538 DATA 4C9C43AE2CØCAD2DØC2Ø 7
    64348A8A53F8552A54Ø 8553AD2
    CØC2DA3ØC855Ø        :REM*8
539 DATA ADDØ1448186D2CØC8D2C Ø
    C683ØØ2A9ØØ6D2DØC8D 2DØCA54
    118692F854EA5        :REM*63
54Ø DATA 4269F3854FA541186947 8
    54CA54269EF854D2Ø7A 182ØDD4
    4AA68A88A2CD2        :REM*148
541 DATA 141ØØ34DA5ØCC9ØØDØØC A
    D2C8Ø2CD3143ØØ7A98Ø 3ØØ32ØØ
    5454CEF18A2Ø3        :REM*94
542 DATA AØ15DØ1ØA2Ø2AØ1ØDØØA A
    2ØØAØØØFØØ4A2Ø1AØØ8 A9FF5DD
    Ø141869Ø19DDØ        :REM*17Ø
543 DATA 141ØØ3A91B2CA9ØØ995Ø 1
    E4C2B1B2ØCF34AØØØA6 5Ø24293
    ØØ5BD6435DØØ3        :REM*215
544 DATA BD6C353152AA24293ØØ6 8
    AFØØ2A9Ø1608AC9Ø49Ø FA4A4A4
    CF9442ØD84424        :REM*239
545 DATA 293ØØ549Ø1186Ø1AADØ Ø
    4AD2C8Ø6ØEØØ3DØØ5B1 4E29ØF6
    ØB14CEØØ1DØØ4        :REM*194
546 DATA 4A4A4A4A29ØF6ØCCA2ØC F
    ØØ39ØØ86ØCDA1ØCFØØ2 BØF8186
    ØCØØØFØØ16ØC9        :REM*153
547 DATA C86ØA93Ø2D87ØCFØ334C F
    645A93Ø2D87ØCFØØ34C F345AEC
    114DØ1EA2Ø78E        :REM*17Ø
548 DATA C114E88EC4142Ø6A18A9 Ø
    F854785462ØC217ØØD8 FF4EØØØ
    82ØEF18A9ØØ2C        :REM*181
549 DATA A98Ø8D19ØCAEC114E88A 2
    Ø9146EØ1ØFØØ8A2Ø8A9 2ØAØ23D
    ØØ6A2Ø5A914AØ        :REM*1Ø8
55Ø DATA 278EØ7ØC8DØ4ØC2ØC436 A
    9FF8DØ5ØCA94E8DØ6ØC AEØ5ØCA
    CØ6ØCADØ4ØC2Ø        :REM*26
551 DATA 2C46ADØ4ØCAEC4142ØØ8 1
    9186DØ5ØC8DØ5ØC8A6D Ø6ØC8DØ
    6ØCCEØ7ØCDØD8        :REM*245
552 DATA 6ØA25B2Ø9F3BA9Ø82Ø87 4
    62Ø591AA2Ø8E19ØCC9 7ØFØ18C
    978FØ23A2ØØ2C        :REM*34
553 DATA A28Ø8E19ØCAØ132ØC436 A
    91Ø2D87ØCFØØFA918A2 152Ø914
    6A217AØF7A9ØC        :REM*168
554 DATA DØ1EA91ØA21Ø2Ø9146A2 Ø
    BAØFAA9122Ø3446A24B AØFCA91
    248AD17ØC2Ø5B        :REM*38
555 DATA 1A688641844285442Ø33 3
    32Ø7A1846292ØCF34Ø6 29AD17Ø
    C8543AØØØA2ØØ        :REM*12Ø
556 DATA 2C19ØC3ØØ7A14191524C 6
    Ø46B1528141E641DØØ2 E642981
    869Ø8A8CC18ØC        :REM*173
557 DATA 9ØE2Ø2Ø43FC643DØD5AD 1
    8ØC2Ø8746C644DØBF2Ø EF184CB
    F361865488548        :REM*255
558 DATA 9ØØ2E6496Ø8D18ØC8E17 Ø
    C6ØAØØBA2FA2Ø23472Ø 7A18A2Ø
    ØAØFF2ØE1469D        :REM*255
559 DATA 4ØØ99D42Ø99D44Ø92ØE1 4
    69D41Ø99D43Ø9E8E8E8 E8E8EØ5
    Ø9ØE24CEF18AØ        :REM*153
56Ø DATA 17A2F7182Ø23472Ø7A18 A
    ØFF2ØE1469919ØDCØ3E 9ØF64CE
    F18C8B13F9141        :REM*17
561 DATA 6ØA91Ø2ØØA47AEAAØCEØ Ø
    32Ø98464CØ7472ØB518 Ø8DA18Ø ►
```


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```
    1ØØA9182ØØA47        :REM*89
562 DATA 2Ø463F4C2B1BAØ1Ø8C8B Ø
    CAAA5ØF38ED8BØCA8A5 1ØE9ØØ9
    ØØ34C3219A9ØØ        :REM*75
563 DATA 6ØØ8843F864Ø84418642 A
    23FCØ17Ø8FØØ2A22Ø2Ø Ø8192Ø4
    947A9F4A2Ø228         :REM*91
564 DATA FØØ4A94ØA2Ø2289ØØA18 6
    53F853F8A654Ø854Ø6Ø A9Ø2A2Ø
    ØFØØAA9Ø4A2Ø3         :REM*221
565 DATA DØØ4A9Ø8A2Ø6484D9CØC 8
    D9CØC682D9CØC2Ø8Ø47 4C2B1BA
    D971C491B8D97         :REM*253
566 DATA 1C4C2B1BFØØ48A4C8A47 8
    AA2ØØ2CA21BA88A998D 1C6ØA2Ø
    ØA9ØØFØØ4A28Ø        :REM*23Ø
567 DATA A91B8D431D491B8D4C1D 8
    ED8144C2B1BA9Ø12CA9 Ø22CA9Ø
    42CA9Ø88DD414         :REM*148
568 DATA A94ØØ52AA2ØØ1ØØ9A28Ø 2
    CA2ØØA52A29BF852A8E AØØC4C2
    B1B2ØD7474C2B         :REM*15
569 DATA 1BCA8ED5148E2ØDØ8AØA Ø
    AØAØA8DD7146ØA21BAD 1DØC498
    Ø8D1DØC1ØØ2A2         :REM*1ØØ
57Ø DATA ØØ8EC71C4C2B1BA94Ø8D 8
    7ØC2Ø8D18AEC114DØØ2 A2Ø7E88
    AA8A9ØØE1ØFØ          :REM*82
571 DATA 28A92ØDØ24A91Ø8D87ØC 2
    Ø8D182ØB518ØØD8E8Ø3 ØØA218A
    Ø151ØØCA92Ø8D         :REM*224
572 DATA 87ØC2Ø8D18A21ØAØ1ØA9 1
    Ø8D8BØC8A4A8D1AØC8A 8E8EØCC
    A8E8FØCØAØA24         :REM*173
573 DATA 291ØØ14A8D89ØC984A69 Ø
    Ø8D1BØC98ØAØA8D8AØC 888C9ØØ
    CA98Ø852AADØB         :REM*225
574 DATA 152Ø8D492ØBF18ØØ5CE8 Ø
    3ØEA9ØE8D21DØ2Ø114A 2Ø4B4A2
    Ø4E45A9Ø28543         :REM*27
575 DATA AØØØA2ØØBDØC152Ø964A C
    8E8E4439ØF44C4E492Ø 7Ø3BA98
    Ø8D87ØCA52Ø8D         :REM*73
576 DATA 88ØC2Ø1E4BA55D4A4A4A C
    9129ØØ7E9ØFA8A9ØFBØ ØC38E9Ø
    4AØØ4BØØ569Ø4         :REM*2Ø6
577 DATA A8A9ØØ18652Ø852Ø98ØA Ø
    AØA855D186915856120 BB24A91
    Ø8D8BØC2Ø114A         :REM*222
578 DATA A9ØØAØ282Ø964A186911 9
    ØF82Ø464BAØAA2ØCB13 A9ØØ852
    32ØA84B2Ø253A         :REM*247
579 DATA BØFBA98Ø8D9FØC2ØC34A 2
    ØC94A2ØCF129ØEB2Ø2F 17A9ØØ8
    D9FØC2ØC34AFØ         :REM*94
58Ø DATA 2D9ØØ624133ØD81ØEBA5 4
    AC968BØE52C87ØC3ØØB A2182ØA
    9492Ø8D494CFF         :REM*18
581 DATA 48A21Ø2ØA94929ØFAAE8 2
    ØD7474CFF482C87ØC3Ø 2A5Ø12A
    D8BØCFØ232ØCC         :REM*23
582 DATA 17BF4A19ØØØ4ØØAØ71DØ 1
    82ØCC17BB4A19ØØØ4ØØ A91Ø2D8
    7ØCFØØ3AØ462C         :REM*21Ø
583 DATA AØ512CAØ6C841E2ØCB13 2
    ØBØ492ØBD134CF348A2 ØE29Ø1F
    ØØFA2ØØ24291Ø         :REM*27
584 DATA Ø9AØ1ØCC87ØCDØØ2A9Ø3 8
    E2ØDØ8DØB156ØA4ØFA5 1Ø4C321
    92C87ØC1ØØ34C         :REM*112
585 DATA 1E4B2ØC9122Ø153BAD8E Ø
    C2ØØF47AE8EØC2ØØ819 855B865
    C186D8BØC855B         :REM*1Ø5
586 DATA 9ØØ2E65C186D8FØC855F A
    55C69ØØ24291ØØ74A66 5F465C6
    65B856ØA44AA9         :REM*15
587 DATA ØØAE8EØC2Ø3219AE8EØC 2
    ØØ819855D865E186D9Ø ØC85618
    A69ØØ85624C46         :REM*2ØØ
588 DATA 4B2ØBF188Ø71CØØDØØA9 Ø
    F8536AØ582Ø314AAØ6Ø 2Ø314AA
    Ø5Ø2Ø2E4AAØ68         :REM*1ØØ
589 DATA A91F2CA9ØØ8431AAAØ26 8
    437A82Ø8D19A9ØØ8548 8549A53
    1854A4CEC19AD         :REM*1Ø1
59Ø DATA 1BØC8543A97Ø8531A9ØØ A
    2252Ø724AA531186ØØ8 8531C64
    3DØEEA91Ø2C87         :REM*14Ø
591 DATA ØCFØØ16ØA922A223AC1A Ø
    C88DØCØ2ØB3349ØØ16Ø 2C87ØC3
    Ø1Ø2ØCF34A2Ø1          :REM*94
592 DATA 2C9FØC3ØØ3AEØB154C27 3
    44CC23399B85D99B95D 99BA5DC
    8C86Ø2Ø913BA2         :REM*18
593 DATA 5BAØ5F2ØA13BADA3ØC49 F
    F255B855BØDA3ØC855F 6Ø28ØØ4
    7Ø138ØØ37Ø12Ø         :REM*32
594 DATA 153B2Ø33332ØBF36A54A C
    95ØBØØ3A9ØØ6ØE97ØBØ Ø16Ø2C8
    7ØC3Ø1ØCD8AØC         :REM*76
595 DATA BØF1A649DØEDA648EC89 Ø
    CBØE64A4A186DF51485 4AACF41
    4A2482Ø5A262A         :REM*2ØØ
596 DATA 186DF31485489ØØ1C884 4
    92Ø784A2ØA24A2ØA84B 38A9Ø16
    Ø8E93ØC4C334B         :REM*155
597 DATA A98Ø8523A94FA2ØØAØ15 8
    E93ØC24291ØØ44E93ØC 6A8D92Ø
    C8C94ØC2Ø253A         :REM*171
598 DATA BØFB2ØØF3B2Ø4E4B9ØF3 2
    Ø9D3BAØ174C3833Ø5B 4B9ØØ21
    86Ø2Ø5B4B4CCF         :REM*233
599 DATA 122Ø9D3BA548186D92ØC 8
    55FA5496D93ØC856ØA8 A55F2Ø2
    B45BØ32A54A48         :REM*25
6ØØ DATA 186D94ØC9ØØ368BØ26C9 C
    8BØF9482Ø183C684885 4A2Ø183
    C2Ø9D3B688561         :REM*132
6Ø1 DATA A9ØØ85622Ø983C2Ø9A3B 6
    8854A2Ø983C186ØA948 A27FAØ8
    Ø2ØA342A55B38         :REM*86
6Ø2 DATA EDF314ØAØA8548A9ØØ85 4
    B2A8549A55D38EDF514 ØAØA186
    97Ø854A2ØCB3F         :REM*98
6Ø3 DATA 2C87ØC1Ø56AØ172ØC436 2
    ØCF34AØ54A24C2ØA13B AØØF2ØC
    4362ØCF34A9ØB         :REM*185
6Ø4 DATA 8D91ØCA2ØØA9Ø48544AØ Ø
    ØA9Ø48543B154814CB1 56814E2
    Ø2E4CC643DØF1         :REM*1Ø5
6Ø5 DATA C8CØØA9ØE8CE91ØCFØ15 C
    644DØDDA55418692885 5485569
    ØCEE655E657DØ         :REM*75
6Ø6 DATA C86ØA24CF6ØØDØØ2F6Ø1 F
    6Ø2DØØ2F6Ø3A2ØØ6Ø2Ø 653BADA
    3ØC8D92ØCA9Ø7         :REM*221
6Ø7 DATA 8D94ØC2ØBF4C2Ø253ABØ F
    B2Ø153B2ØA24AA55D29 F8855D2
    Ø4E4B9ØE7A9Ø1         :REM*238
6Ø8 DATA A2ØØ2Ø81382Ø153B2ØD8 4
    4C9ØØFØD62ØØ5452Ø8Ø 4C4C4D4
    CCD1EØCFØ268D         :REM*224
6Ø9 DATA 2ØDØ8D2ØØCØAØAØAØA8D 2
    1ØC2ØC912A9ØE854685 472Ø6C3
    8AD21ØCAE1FØC         :REM*184
61Ø DATA 2ØCE3824293ØØ16Ø2ØB6 4
    CA54EA64F2Ø7Ø38AD2Ø ØCAE1EØ
    C4CCB38AD1EØC         :REM*2Ø8
611 DATA 8D2ØDØØAØAØAØA8D1FØC 6
    Ø2Ø653B2ØBF4C2ØFA3A 2ØD844C
    9ØØFØF32ØØ545         :REM*42
612 DATA 482Ø7D382ØCC34682Ø8Ø 4
    C4CDØ4CCA8A48AEØ8ØC BD2C1D2
    Ø8747688DØ8ØC         :REM*158
613 DATA AABD2C1D2Ø8A474C2B1B C
    A8A48AEØ9ØCBD2F1D2Ø 8747688
    DØ9ØCAABD2F1D         :REM*89
614 DATA 2Ø8A474C2B1B8A38E9Ø4 4
    8AEØAØCBD321D2Ø8747 688DØAØ
    CAABD321D2Ø8A         :REM*127
615 DATA 474C2B1B2Ø373B2ØE839 A
    EØBØCE88A48AEØ8ØC8E A6ØC2Ø2
    A19242910Ø14A         :REM*88
616 DATA 8D92ØCA9ØØ8D93ØCCE92 Ø
    C68AEØ9ØC8EA7ØC2Ø2A 198D94Ø
    CCE94ØC2Ø253A         :REM*35
617 DATA BØFB2ØCF129ØØD2Ø394B 2
    Ø153BAØ1B2Ø38333ØE9 2ØCC17F
    7145BØØØ4ØØ2Ø         :REM*1Ø6
618 DATA 5B4B9ØØ82ØØE4E2Ø4B4E F
    ØD32Ø5B4B2ØØ94E2ØØ1 14C9ØØF
    ØC62Ø13279ØØ6         :REM*22Ø
619 DATA 2Ø164E4C734D2Ø4317AE Ø
    BØCFØ13EØØ7DØØ4186D ØFØC2ØD
    64D2Ø9F4E9ØØ3         :REM*255
62Ø DATA 2Ø4B4E4C734D8E1Ø158E 1
    115A8ADØDØCAEØEØC2Ø AC172Ø6
    A18AØØØB15499         :REM*122
621 DATA 19ØDC8CCØCØC9ØF52ØEF 1
    8AEØAØC2Ø2819ØAØAØA A219AØØ
    D4CEE3FAØ1B4C         :REM*152
622 DATA C4362ØØ114C9ØØDØF96Ø C
    9ØDFØ31C914FØ43C912 DØØ6A98
    Ø8DØFØC6ØC992         :REM*127
623 DATA DØØ4A9ØØFØF4C99DF04C C
    91DFØ67C991DØØ34CBF 4EC911D
    ØØ34CD24EC913         :REM*123
624 DATA FØØD6Ø2ØD24EA9ØØ8DF7 1
    48DF8146ØA9ØØ8DF914 8DFA14F
    ØEF2Ø8Ø4EBØØ1         :REM*142
625 DATA 6Ø2ØØ94EADØAØC48A9ØØ 8
    DØAØCAEØBØCA92Ø2ØD6 4D688DØ
    AØC6ØEE92ØCAD         :REM*146
626 DATA F71438ED92ØCCE92ØC48 A
    DF814E9ØØBØØ2686Ø8D F814688
    DF7146ØEE92ØC         :REM*12Ø
627 DATA ADF714ACF814186D92ØC C
    E92ØC9ØØ1C82Ø2B459Ø Ø16Ø8CF
    8148DF7146ØEE         :REM*58
628 DATA 94ØCADF91438ED94ØCCE 9
    4ØC9ØØ38DF9146ØEE94 ØCADF91
    4186D94ØCCE94         :REM*139
629 DATA ØCC9C8BØØ38DF9146Ø4C
                          :REM*214
63Ø DATA -1               :REM*229
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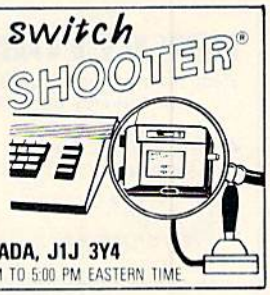

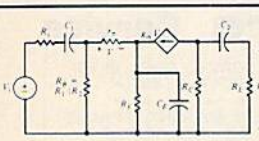

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RUN's Checksum

TYPE IN *RUN*'s CHECKSUM, which serves for both the C-64 and for the C-128 in either 40- or 80-Column mode, and save it to disk before running. When typing in a program from *RUN*, first load and run *RUN*'s Checksum. The screen will display a SYS number that deactivates and reactivates the Checksum. Always disable *RUN*'s Checksum before attempting to run another program. Note: You can abbreviate Basic keywords; spaces affect the checksum only when within quotes; and the order of characters affects the checksum.

With this new version, when you press return after typing in a program line, a one-, two-, or three-digit number from 0 to 255 appears in the home position. If this number matches the checksum value in the program listing, the line is correct. If the number that appears *doesn't* match the checksum value, compare the line with the magazine listing to find your error. Then move the cursor back up to the line and make your corrections. Now, after you press return, the correct checksum value should appear. Continue entering the listing until all the lines have been correctly typed. Then deactivate *RUN*'s Checksum, using the SYS number. Save the finished program.

All the graphics and control characters in the listings in *RUN* have been translated into understandable key combinations. They are the instructions you see inside the curly braces. For example, {SHIFT L} means you hold down the shift key while you press the L key. You do *not* type in the curly braces. What appears on the screen will look quite different from what is designated inside the braces. Here are some more examples:

{22 SPACEs}—press the space bar 22 times

{SHIFT CLR}—hold down the shift key and press the clr-home key

{2 CRSR DNs}—press the cursor-down key twice

{CTRL 1}—hold down the control key and press the 1 key

{COMD T}—hold down the Commodore logo key and press the T key

{FUNCT 1}—press the F1 key

{5 LB.s}—press the British pound key (*not* #) five times R

Listing 1. *RUN*'s Checksum program. This program is available on *RUN*'s BBS for users to download.

```
10 REM RUN'S CHECKSUM 64/128 - BOB KODADEK
20 MO=128:SA=3328:IF PEEK(4096)THEN MO=64:SA=4
   9152
30 FOR I=0TO169:READB:CK=CK+B:POKE SA+I,B:NEXT
40 IFCK<>20651 THENPRINT"DATA ERROR!":END
50 POKESA+11,24:POKESA+111,38:POKESA+14,234
60 PRINTCHR$(147)STR$(MO)" RUN CHECKSUM":PRINT
70 PRINT"TO TOGGLE ON OR OFF, SYS"SA:IF MO=128
   THEN 100
80 POKESA+13,124:POKESA+15,165:POKESA+25,124:PO
   KESA+26,165
90 POKESA+39,20:POKESA+41,21:POKESA+123,205:POK
   ESA+124,189
100 POKESA+4,INT(SA/256):SYS SA:NEW
110 DATA 120,162,24,160,13,173,4,3,201,24,208,4
    ,162,13,160,67,142,4,3,140
120 DATA 5,3,88,96,32,13,67,152,72,169,0,141,0,
    255,133,176,133,180,166,22
130 DATA 164,23,134,167,132,168,170,189,0,2,240
    ,58,201,48,144,7,201,58,176
140 DATA 3,232,208,240,189,0,2,240,42,201,32,20
    8,4,164,180,240,31,201,34
150 DATA 208,6,165,180,73,1,133,180,230,176,164
    ,176,165,167,24,125,0,2,133
160 DATA 167,165,168,105,0,133,168,136,208,239,
    232,208,209,169,42,32,210
170 DATA 255,165,167,69,168,170,169,0,32,50,142
    ,169,32,32,210,255,32,210
180 DATA 255,169,13,32,210,255,104,168,96,104,1
    70,24,32,240,255,104,168
190 DATA 96,56,32,240,255,138,72,152,72,24,162,
    0,160,0,32,240,255,169
200 DATA 42,208,198
```

APRIL

COMING ATTRACTIONS

IS COMPUTING HAZARDOUS TO YOUR HEALTH?—

Do you have concerns about spending long hours at your computer? In April we'll offer some safety precautions you should take to prevent eyestrain, fatigue, aches or other health-related complaints, and take a look at *ergonomics*, the study of how technology affects the human body.

BIG BLUE COPIER—

Next month we begin a series of programs that let you copy files from MS-DOS to the Commodore computers and format an MS-DOS-compatible disk.

CES REPORT—

Commodore manufacturers and developers showcased their latest products at the Winter Consumer Electronics Show in Las Vegas in January. We'll present the highlights of the show and give you a preview of the products you'll be seeing in 1989.

QUICK WRITER—

If you're still searching for a C-128 80-column word processor, then this easy-to-use, menu-driven program may be just what you're looking for.

PLUS—

Reviews of the latest software releases, a hands-on review of the four-member family of NX-1000 printers, and *RUN*'s regular features and columns—including news, hints and tips and answers to readers' questions to help you get the most out of your Commodore computer.

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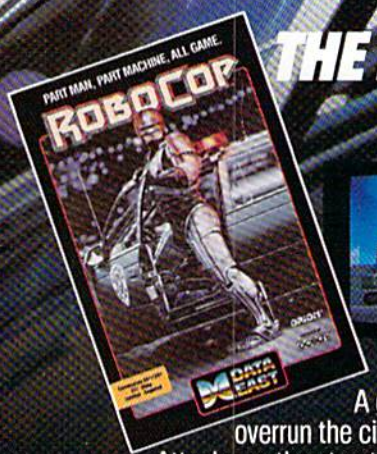

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